

G. H. DELANO

MASSACHUSETTS
HIGHWAY COMMISSION

YEAR ENDING NOVEMBER 30

1919

56

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George N. Gleason.
Middleboro.



Asphalt macadam in Dracut after five years of use.

TWENTY-SEVENTH ANNUAL REPORT

OF THE

MASSACHUSETTS
HIGHWAY COMMISSION

FOR THE FISCAL YEAR ENDING NOVEMBER 30, 1919

JANUARY, 1920



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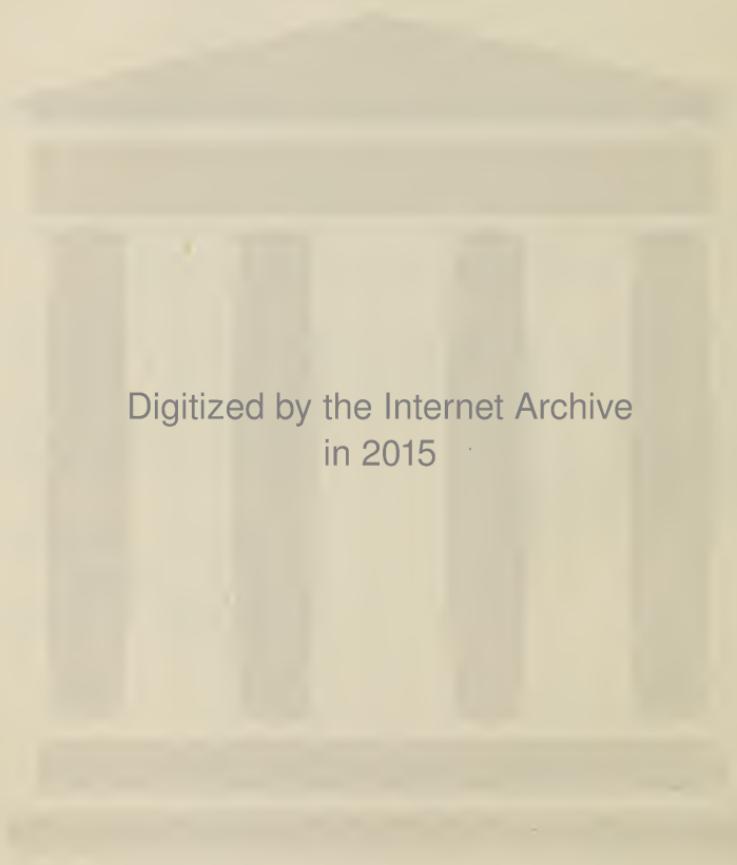
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APPROVED BY THE
SUPERVISOR OF ADMINISTRATION.

The Commonwealth of Massachusetts.

*To the Honorable Senate and House of Representatives of the Commonwealth
of Massachusetts in General Court assembled.*

The undersigned commissioners, appointed under the provisions of chapter 476 of the Acts of 1893, and of chapter 474 of the Acts of 1900, herewith submit their twenty-seventh annual and final report, in accordance with the provisions of chapter 344 of the General Acts of 1917, for the fiscal year ending Nov. 30, 1919.

WM. D. SOHIER.
F. D. KEMP.
JAMES W. SYNAN.



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ANNUAL REPORT OF THE MASSACHUSETTS HIGHWAY COMMISSION.

This is the twenty-seventh annual and final report of the Massachusetts Highway Commission. The Board consists of the same members as last year. Mr. William D. Sohier of Beverly was reappointed by Governor Coolidge and qualified on March 21, 1919.

By an amendment to the Constitution, which was adopted by the people, the Legislature was required to reorganize the executive and administrative work of the Commonwealth into not more than twenty departments. In 1919 the Legislature, by chapter 350 of the General Acts, provided for a Department of Public Works to be in charge of a commissioner and four associate commissioners, two to be in charge of the Division of Highways and two to be in charge of the Division of Waterways and Public Lands, the commissioner to appoint a registrar of motor vehicles.

ORGANIZATION.

The Commission has had under its charge road work, the registration of motor vehicles and the licensing of the operators thereof, as well as the investigation of automobile accidents. There is a department for highway work and another for motor vehicles, with a separate division for the investigation of accidents and the examination of operators. A chart is included in the 1913 report, showing the organization more in detail.

HEARINGS.

During the year 611 hearings were given on automobile complaints and accidents and matters relating to the registration and operation of motor vehicles. Two public hearings were given on special regulations made by municipal authorities affecting the use and operation of motor vehicles. One hearing

was given on a petition for the relocation of a street railway on a State highway.

In addition to the regular hearings held in each of the fourteen counties, the Commission gave many hearings on petitions from various cities and towns for State highways or for aid in the improvement of town ways. Besides these formal hearings one or more members of the Commission met the municipal authorities, or inspected the roads to be built or improved by the municipalities or otherwise, in more than three-fourths of the towns of the Commonwealth.

STATE HIGHWAYS.

During the year ending Nov. 30, 1919, the Commission completed work on about 21.5 miles of State highway, portions of which were laid out in 1918. Construction was commenced, but not completed, on over 17 miles of road in 13 cities and towns. Layouts were made of about 64.50 miles of State highway in 32 cities and towns. The total length of State highways at the end of the year was 1,311.04 miles.

SURVEYS, ESTIMATES AND DESIGNS.

During the year preliminary surveys, plans and estimates were made on contemplated State highways in 47 towns, covering an aggregate distance of 96.56 miles. Lines and grade for construction work on State highways were made in 29 towns, covering an aggregate distance of 44.92 miles, and for resurfacing work in 14 towns, covering an aggregate distance of 31.86 miles.

Final surveys were made on completed State highways in 15 towns, covering an aggregate distance of 30.91 miles, and on roads other than State highways in 8 towns, covering an aggregate distance of 8.18 miles.

On "small town" and "motor vehicle fees fund" work, so called, preliminary surveys, including plans and profiles, were made in 26 towns, covering an aggregate distance of 20.53 miles. Line and grade for construction have been made on these roads in 41 towns, covering an aggregate distance of 28.6 miles. In addition to the above, surveys have been made in 4

towns, covering an aggregate distance of .74 mile, said roads to be constructed by the town; and line and grade for construction for this class have been made in 1 town, covering an aggregate distance of .38 mile.

Under chapter 155 of the General Acts of 1918 surveys have been made in 3 towns, covering an aggregate distance of .61 mile; and lines and grades for construction have been made in 2 towns, covering an aggregate distance of .14 mile.

Under the "western counties" appropriation (chapter 221, General Acts of 1915) surveys have been made in 3 towns, covering an aggregate distance of .59 mile; and lines and grades for construction have been made in 5 towns, covering an aggregate distance of 4.54 miles.

Layout plans have been made in 32 towns, covering an aggregate distance of 64.50 miles. Plans to accompany decrees for street railway locations on State highways have been made in 2 towns.

Special surveys, plans, etc., have been made in 12 towns, covering an aggregate distance of 28.6 miles; and lines and grades for construction have been made in 3 towns, covering an aggregate distance of 3.81 miles.

ROADS CONSTRUCTED IN 1919.

Construction has been completed on 21.55 miles of State highway, 3.43 miles of highways under the provisions of the "small town" act, 51.52 miles of highways under the provisions of chapter 525 of the Acts of 1910, and 20.18 miles of highways under the provisions of special acts, making a total of 96.68 miles completed during the year.

Of the above roads completed this year, 1.64 miles were of water-bound macadam; 26.19 miles were of gravel; 3.04 miles were of sand bound with asphalt; 40.48 miles were of bituminous macadam, that is, macadam with bituminous binder incorporated in the top course; 3.56 miles were of water-bound macadam with an oil or tar surface applied; 5.47 miles were of crushed gravel with the top surface bound with asphalt; 6.98 miles were of cement concrete; 7.22 miles were of gravel with an oil surface applied; and 2.10 miles were dirt roads, that is, surfaced with the best available material.

TREES ON STATE HIGHWAYS.

During the last fifteen years 44,130 trees have been planted on the borders of the State highways, of which 3,273 were planted this year, the Commission continuing its policy of planting quick-growing trees and hedges to replace guard rails.

PERMITS.

There were 743 permits issued during the year for opening or occupying State highways for various purposes.

BRIDGES AND CULVERTS.

The following is a detailed list of the bridges and culverts of 8-foot span, or greater, built during the year 1919, or contemplated, and for which designs and plans have been prepared:—

Bridges built or contracted for in 1919.

Amherst — over Fort River; a 60-foot concrete arch.

Becket — over Walker Brook (extension); a 44-foot concrete beam.

Bernardston — over Shattuck Brook; a 34½-foot concrete beam.

Bernardston — over Couch Brook; a 32-foot concrete beam.

Cummington — over Westfield River; a 100-foot concrete arch.

Freetown — over Mill Pond (extension); an 8-foot concrete arch.

Williamstown — over Green River; a 39-foot concrete beam.

Contemplated Bridges.

Billerica — over Concord River; a three-span concrete arch, 50, 55 and 50 feet, respectively.

Brimfield — over Elbow Brook; a 17-foot concrete beam.

Cummington — over Westfield River; an 80-foot concrete arch.

Cummington — over Westfield River; a 38-foot concrete beam.

Cummington — over branch of Westfield River; a 13-foot concrete beam.

Cummington — over branch of Westfield River; a 14-foot concrete beam.

Dana — over Mill Pond; a 20-foot concrete beam.

Grafton — over Blackstone River; a 70-foot concrete arch.

Harwich — over Allen's Harbor; a 12-foot concrete slab.

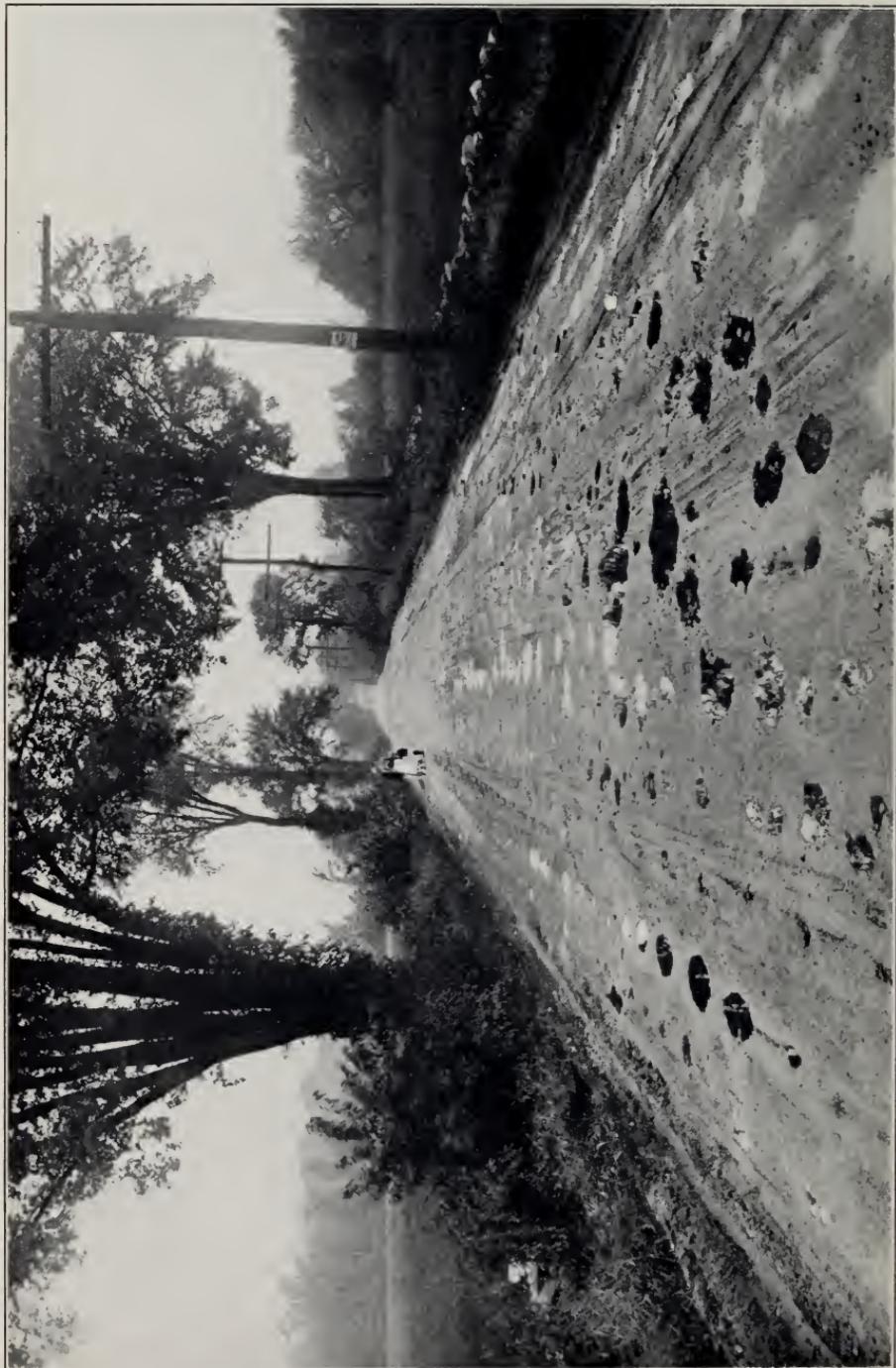
Huntington — over Westfield River; a three-span concrete arch, 55, 75 and 55 feet, respectively.

New Ashford — over branch of Green River; a 16-foot concrete beam.

New Ashford — over branch of Green River; a 16-foot concrete beam.

Oak Bluffs — over Lagoon Pond; a 221-foot concrete trestle.

Topsfield — over Ipswich River; a 42-foot concrete arch.



Old gravel surface in Billerica.

Cement concrete surface in Billerica.



Ware — over Flat Brook; a 12 $\frac{3}{4}$ -foot concrete slab.

Ware — over Muddy River; a 20-foot concrete beam.

Warwick — over Orcutt Brook; a 36-foot concrete arch.

Westfield — over Frog Hole Brook; a 35-foot concrete beam.

ENGINEERING ADVICE TO MUNICIPAL AUTHORITIES.

The requests for engineering advice are more numerous every year, and in all cases the Commission sends an engineer to look over the ground. In some cases the Commission furnishes plans and specifications for the work, advertises the contract and arranges for the supervision of the work, the municipality paying the estimates as they become due.

The Commission furnished engineering advice to 52 cities and towns this year, and these municipalities expended over \$902,800 of their own money for the improvement of highways and bridges.

STATE HIGHWAY AND SMALL TOWN WORK.

A total of about 1,311 miles of State highway have been constructed at a cost to the State and counties of approximately \$13,500,000.

Some 550 miles of highway in 197 towns have been improved under the provisions of the "small town" act, at a cost to the State and counties of about \$1,275,000.

The towns have contributed over \$1,000,000 toward the cost of State highways, and somewhat less than \$1,000,000 toward the cost of the "small town" work.

CO-OPERATIVE WORK, USING MOTOR VEHICLE FEES.

Over 465 miles of highway on main and secondary routes have been constructed during the last ten years by co-operation between the Commonwealth and the municipalities and the counties.

The Commission has used the 20 per cent of the motor vehicle fees made available by the Legislature for this purpose. The total available for these improved highways was \$6,029,656; of this amount the State had allotted from the motor vehicle fees, \$2,744,890; 235 towns had appropriated \$2,690,789; and the counties had appropriated \$593,977.

This work is shown in the following table:—

YEAR.	Number of Towns worked in.	Number of Towns contrib- uting.	AMOUNTS CONTRIB- UTED BY —		Allotted by State.	Totals.
			Towns.	Counties.		
1912, ¹	—	—	\$71,000 ²	—	\$107,785	\$178,785
1913, ³	178	—	310,000 ²	—	295,000	605,000
1914,	169	111	260,274 ²	—	301,380	561,654
1915,	196	111	320,500 ²	—	338,600	659,100
1916,	186	162	391,000	\$123,000	379,000	893,000
1917,	210	190	419,000	133,000	468,000	1,020,000
1918,	137	112	277,015	105,033	364,125	746,173
1919,	215	235	642,000	232,944	491,000	1,365,944
Totals,	—	—	\$2,690,789	\$593,977	\$2,744,890	\$6,029,656

¹ The motor vehicle fees were made available in 1910.

² Includes some county contributions.

³ Until 1913 only \$75,000 a year was available under the "small town" act; in 1913 the amount was increased to \$150,000, and that amount was also available in 1914, 1915, 1916 and 1917.

In addition, about 130 miles have been constructed with funds provided by the Legislature under special acts, covering particular roads and routes. This makes a total of improved mileage of highway on main and secondary routes in the country districts of 2,456 miles, divided as follows:—

	Miles.
State highways,	1,311
"Small town" roads,	550
Roads improved with motor vehicle fees fund,	465
Roads built under special acts,	130
	2,456

The total mileage of highways in the Commonwealth is 23,357, as nearly as can be ascertained, of which 17,000 miles are located outside of villages and thickly settled city districts.

Many miles of these country roads are merely byways and roads of little importance. Over 14 per cent of these highways have already been constructed, and practically all are maintained in good condition.

Massachusetts has a much larger percentage of improved highways in the country districts, constructed, maintained and kept in good condition, on the main and secondary routes, than has any other State, with the possible exception of Connecticut.

RESURFACING AND WIDENING.

During the year 41.75 miles of State highway were resurfaced, 10.21 miles were widened but not resurfaced, and 38.52 miles were widened and resurfaced. These figures are for completed work. There is uncompleted work in various stages on a number of miles of road where the work will be completed next year. The total cost of this work of widening and resurfacing was over \$894,525, the widening costing over \$257,000. The resurfacing cost \$636,781, or an average of about \$15,250 a mile.

The older State highways, which have been successfully maintained for the last ten to twenty years with surface coats of bituminous material and constant patching, have been broken up in many instances during the last season, especially when the frost was coming out of the ground. This was particularly true where there was a large motor truck traffic. These roads, some of which were built twenty years ago, require rebuilding and strengthening to withstand the traffic.

Ordinary Maintenance.

Ordinary maintenance includes the patching done by the section men in charge of the roads. This work cost over \$512,400, or about \$368 a mile for the 1,311 miles of State highway. Of course, some of the new roads required very little maintenance.

State Highways resurfaced and widened in 1913-19.

For many years the Commission called the attention of the Legislature to the fact that the number of motor vehicles was rapidly increasing; that the traffic on the main highways was about doubling every three years; that many of the State highways were old and wearing out, and were too narrow for the large and constantly increasing traffic.

In 1903 there were only 430 miles of State highway, and the Commission's estimate for their maintenance was \$45,000 to \$50,000, or about \$100 a mile a year.

In 1908 there were 740 miles of State highway, and the estimate for maintenance and resurfacing was \$684,000. The year

before the estimate was \$317,000, but because of the heavy motor traffic this estimate had to be doubled.

In 1913 there were 980 miles of State highway; and while the 240 miles of road built during the previous five years were wider and stronger than those constructed earlier, very little money had been made available for widening and resurfacing the older highways, 430 miles of which were already ten years old.

The engineers estimated in 1913 that \$3,000,000 was needed to resurface and widen the older State highways. Since then the Legislature has made more money available.

The motor vehicle fees available for the maintenance of State highways have increased very rapidly, as has also the money repaid by the cities and towns because of expenditures on State highway maintenance, and both have been appropriated by the Legislature for this use.

State Highways resurfaced and widened in 1914-19, inclusive.

YEAR.	Widened only (Miles).	Widened and re- surfaced (Miles).	Re- surfaced only (Miles).	Total Cost.	Widening only.
1914,	12.50	37.50	33.00	\$450,000	\$47,000
1915,	18.00	46.00	19.25	597,200	130,000
1916,	21.50	40.00	11.50	657,000	156,000
1917,	26.00	77.75	7.25	1,262,000	352,000
1918,	36.83	59.16	1.60	1,092,835	327,905
1919,	10.21	38.52	3.24	894,525	257,744
Totals,	125.04	298.93	75.84	\$4,953,560	\$1,270,649

In 1913, 33 miles of State highway were resurfaced. Including this mileage, 407 miles in all have been resurfaced and 125 more miles have been widened, or 532 miles out of the 980 miles that were constructed prior to 1913. This leaves 573 miles of the older roads that have not yet been resurfaced, and 454 that have not been widened.

Maintenance.

The maintenance of the older State highways was the most serious problem that the Commission had to solve. Practically every mile of road on any main route had to be coated with

Asphalt macadam in Tewksbury.



some bituminous material and had to be constantly patched and maintained.

Most of the roads which had been either constructed or resurfaced during the last five years were of some form of bituminous construction, or were built with some more durable pavement, except a few miles of gravel or macadam roads on secondary routes having a small traffic.

The Commission resurfaced and strengthened the weaker sections of State highway first, and these sections were formerly, of course, the most expensive to maintain.

The cost of maintenance, patching and the use of light oil or tar for the last four years is shown by the following table:—

YEAR.	Expense of Mainte- nance.	Patching.	LIGHT OILING.		Total Cost.
			Miles.	Cost.	
1916,	\$145,000	\$177,000	600	\$164,500	\$486,500
1917,	147,000	189,000	557	171,750	507,750
1918,	171,142	300,129	397	185,883	657,154
1919,	206,483	305,923	667	203,268	715,674
Totals,	\$669,625	\$972,052	2,221	\$725,401	\$2,367,078

It will be noted that the number of miles coated with oil or tar in 1918 was much smaller than in previous years. This was largely because we could not secure the bituminous materials, as the government could not issue permits allowing their sale and transportation.

In 1916, 600 miles were coated with some bituminous material at a cost of \$164,500, or \$274 a mile.

In 1918 only 397 miles could be coated, but it cost \$185,883, or nearly \$470 a mile, an increase of over 71 per cent.

This increased cost was on account of the increased price of labor and materials, and also because of the delay in the arrival of the materials.

In 1919, 666½ miles were coated with some bituminous material, and it cost only \$203,268, or an average cost of \$306 per mile of road coated.

The total amount spent in 1919 for resurfacing, widening, maintenance and oiling was about \$1,610,200.

Expenditures for the Maintenance, Resurfacing and Widening of State Highways.

The total appropriations made from revenue since 1903 for the maintenance, widening, strengthening and resurfacing of State highways amount to \$3,292,177. This amount has included the appropriations for the maintenance of the Fall River and Newburyport bridges, and the suppression of insect pests.

The total amount secured from the motor vehicle fees fund since the beginning (1908), and expended for the maintenance, widening, strengthening and resurfacing of State highways, is \$9,231,918, making a total expenditure for these purposes, from 1903 to 1919, inclusive, of over \$12,500,000. The motor vehicle fees have provided over 73 per cent of this amount.

HOW STATE HIGHWAY FUNDS WERE SECURED.

The appropriations for the construction of State highways and for the improvement of so-called "small town" roads amount to \$15,250,000.

Until 1913 the money was secured by issuing thirty-year bonds. The \$5,000,000 appropriated for use in 1913 and the four succeeding years was secured by issuing fifteen-year serial bonds. The \$1,000,000 appropriated in 1919 was secured from ordinary revenue.

From the beginning the counties were required to repay to the Commonwealth 25 per cent of the cost of construction of State highways and "small town" roads, and the amounts so repaid were used to reduce the amount of bonds issued. Consequently the amount of bonds issued has always been considerably less than the amounts authorized or than the actual expenditures.

The total amount of bonds issued to Nov. 29, 1919, for State highway and "small town" construction was \$11,767,000; the amount outstanding Nov. 29, 1919, was \$8,925,000; the sinking fund amounted to \$3,630,760.45; and the net debt was only \$5,294,239.55.

STATE HIGHWAYS AND BRIDGES CONSTRUCTED AND PAID FOR, IN WHOLE OR IN PART, UNDER SPECIAL ACTS, OR BY THE COUNTIES, CITIES OR TOWNS, AND LAID OUT AS STATE HIGHWAYS.

It is difficult to ascertain what has been the actual cost of construction of the 1,311 miles of highway and the bridges included in the State highway system.

In some cases the highways were constructed with funds appropriated under special acts of the Legislature, and the roads afterwards laid out as State highways. A good illustration of this is the shore road in Lynn and Revere, for which about \$600,000 was appropriated by several special acts, the highway afterwards being laid out as a State highway. The total expenditures under these special acts should be added to the cost given for the construction of State highways to ascertain the total cost.

The same thing is true in a great many other places, as, for instance, where roads were built with funds provided by the western counties act and afterwards laid out as State highways.

In other cases a portion of the work was done with money provided by special acts, and before the road was completed it was laid out as a State highway, the balance of the cost of construction being obtained from the regular State highway funds. The Jacobs Ladder road in Becket and the Mohawk Trail are two examples, a special appropriation being made for each road, \$75,000 for the Ladder and \$150,000 for the Trail. This \$225,000 should be added to the cost of constructing State highways to ascertain the total cost.

A great many illustrations of the same sort could be given where the counties, cities and towns paid the whole or a portion of the cost of constructing roads which are now State highways. For instance, Falmouth in 1904 appropriated \$75,000, and constructed $11\frac{1}{2}$ miles of road from the Bourne line to Woods Hole, which was afterwards laid out as a State highway. The same thing has happened in other places, but the money expended by the towns, etc., in constructing these roads does not appear in the expenditures of the Commission.

In other places the town or county or both agreed to pay a certain portion of the cost of construction as the work progressed, and this money should also be added to the construction cost of State highways, because the expenditures from the

State highway construction fund were shown only in the reports, except in occasional footnotes. For instance, Yarmouth voted in 1894 to appropriate \$50,000 and to pay one-half of the cost of constructing any State highways that might be laid out in that town. Eight and three-quarters miles of State highway were laid out and constructed from 1894 to 1897, inclusive. The cost to the State, as shown in the reports, was about \$38,000, but to this should be added the \$38,000 paid by the town of Yarmouth.

In Beverly, on the road toward Manchester, over $3\frac{1}{2}$ miles of State highway were constructed in 1905 and 1906, the agreement being that the State should pay one-third of the cost of construction, and the other two-thirds and the land damages should be paid by a committee of citizens. The amount paid by the Commonwealth toward the cost of constructing this $3\frac{1}{2}$ miles is shown in the reports to be about \$13,350; to this should be added over \$27,000 paid by the committee.

This sort of arrangement has been going on for years, not only on highways but on bridges as well.

In several instances the Commission laid out and constructed sections of State highway, and the county or town paid for and constructed bridges which were included in the State highway layout. In some cases street railway companies paid a portion of the cost of constructing bridges and highways.

Total Cost of the State Highway System, including Bridges.

Gross expenditure from the construction fund for State highways, including expenditures for "small town" roads, trees, etc., 1894 to 1919, inclusive,	\$14,672,877
To show the cost of constructing State highways paid by the Commonwealth —	
Deduct "small town" expenditures,	\$1,272,877
Deduct cost of trees, 1904 to 1919, inclusive,	108,358
Deduct salaries, office expenses, etc., taken from the fund, 1894 to 1897, inclusive (afterwards by revenue appropriation),	74,978
Deduct cost of maintenance of State highways taken from construction fund, 1896 to 1902, inclusive (afterwards paid by revenue appropriation and from the motor vehicle fees),	187,757
	—
Total expenditures paid by the Commonwealth,	1,643,970
	—
Total expenditures paid by the Commonwealth,	\$13,028,907

¹ The counties by law repay 25 per cent of this amount.

*Expenditures under Special Acts and by Counties, Municipalities, and from
“Small Town” and Motor Vehicle Fee Funds.*

Towns and counties built and paid for $23\frac{7}{8}$ miles laid out afterwards as State highway,	\$186,296
Built and paid for $43\frac{3}{8}$ miles from “small town” and motor vehicle fee funds, afterwards laid out as State highway,	361,772
Built and paid for 85 miles, under special acts, afterwards laid out as State highway,	2,277,372
Contributions by counties and 109 municipalities toward the cost of constructing (about 45 per cent) the State highways, estimated at about 228 miles,	1,026,106
Newburyport-Salisbury bridge,	325,000
Brightman Street bridge, Fall River,	1,064,934
Total cost of constructing State highways and bridges,	\$18,270,387

Net Amount to be paid by the Commonwealth for the State Highways and Bridges.

Paid from State highway construction fund,	\$13,028,907
Deduct 25 per cent paid or to be paid by counties,	3,257,228
Paid by the Commonwealth,	\$9,771,679
Add amount paid from “small town” fund,	10,850
Add amount paid under special acts and appropriations,	2,277,372
	\$12,059,901
Deduct repayments made by counties and municipalities under special acts,	\$205,525
Deduct amounts due or to become due under the Federal aid act for work already done,	366,925
	572,450
Total net cost to the Commonwealth,	\$11,487,451

Highways and Bridges built and paid for by the Counties or Municipalities and laid out afterwards as State Highways.

	Miles.	Cost.
Falmouth, 1895,	$11\frac{1}{2}$	\$75,000
Pittsfield, 1913,	$1\frac{3}{4}$	22,500
Acushnet, 1903,	1	5,500
Hamilton, 1909,	$\frac{3}{4}$	6,250
Hamilton, 1916,	$\frac{3}{4}$	7,500
Rowley, 1908, railroad bridge and approaches,	-	17,000
Marion, 1903,	$2\frac{1}{8}$	13,370
Rochester, 1903,	$5\frac{1}{4}$	32,926
Fitchburg, 1901,	1	6,250
Totals,	$23\frac{7}{8}$	\$186,296

Highways built and paid for under "Small Town" Act or from Motor Vehicle Fee Fund, and laid out afterwards as State Highways.

	Miles.	Amount.
Huntington, 1916,	-	\$1,500
Wellfleet,	¼	1,653
Becket (motor vehicle fees),	-	7,660
Cheshire bridge, 1912-13,	-	5,000
Lee bridge, excess cost (chapter 525, Acts of 1910),	-	2,900
Freetown, 1914,	-	8,000
Norton, 1903 and 1909,	1½	6,396
Edgartown, 1915,	-	4,000
Conway, 1912-13,	-	2,000
Deerfield, 1917-18,	-	31,782
Northfield, 1919,	-	6,000
Blandford (several years),	4	23,600
Amherst, 1912-14, 1917-18,	-	30,148
South Hadley,	-	2,000
Billerica,	3½	21,000
Holliston, 1916,	-	4,000
Littleton, 1913,	-	2,600
Littleton,	¾	8,000
Westford, 1903,	¾	2,800
Avon, 1914,	-	11,000
Braintree, 1915-16,	-	20,000
Walpole, 1916,	1	8,085
Bridgewater, 1913-17, 1919,	1	10,423
Weymouth, 1915, on Plymouth Pike,	2	5,000
Duxbury, 1914-15,	3¾	23,500
East Bridgewater, 1913, 1915, 1917, Bedford Street,	3¾	17,390
Kingston, 1916,	⅞	2,000
Lakeville, 1913,	-	4,000
Rochester, 1913,	-	2,200
Wareham, 1916-17,	-	13,085
Ashburnham, 1913-14,	5½	10,600
Barre, 1914-15,	-	18,000
Oakham, 1914-15,	-	3,000
Petersham, 1912-13, 1915,	-	7,300
Rutland, 1913-15,	-	9,550
Warren, 1916,	-	3,250
Westminster, 1913-18,	5	8,450
Winchendon, 1913-15, 1919,	6	13,900
	43¾ ¹	\$361,772 ¹

¹ The total mileage built with these funds is shown in this table, although the counties' and municipalities' contributions were used as well and are shown in another table.

Highways built and paid for under Special Acts and Appropriations, and afterwards laid out as State Highways.¹

Bourne, Special Acts of 1916, county of Barnstable,	\$2,500
Bourne, State, under special act,	2,500
Mashpee, Special Acts of 1915 (portion of cost of 2½ miles),	14,000
Sandwich, 1915 (1 mile),	10,000
Truro, special acts,	3,500
Becket, chapter 221, Acts of 1915 (7 miles in all),	87,996
Becket, Special Acts of 1914,	10,000
Becket, 1908-09 (Jacobs Ladder, 4 miles),	75,000
Egremont, Special Acts of 1914 (1 mile),	15,000
Great Barrington, chapter 221, Acts of 1915 (1½ miles),	35,827
Sheffield, chapter 221, Acts of 1915 (3½ miles),	49,926
Windsor, chapter 221, Acts of 1915 (about 1 mile),	41,490
Windsor, special act (paid part of cost of 3 miles),	20,000
Norton, 1915-16 (1½ miles),	20,000
Lynn, Special Acts of 1899 (1 mile),	100,000
Newbury, 1909, Parker River bridge,	20,000
Salisbury, 1911, 1914, Beach Road (2 miles),	24,657
Charlemont, 1911-12, Trail (one-half cost of 16 miles),	149,999
Conway, chapter 221, Acts of 1915 (3 miles),	81,515
Deerfield, chapter 221, Acts of 1915, Conway Road (3½ miles),	54,644
Shelburne, special act (4½ miles),	29,968
Chester bridge, Special Acts of 1910,	19,999
Palmer, chapter 221, Acts of 1915, Ware Road (4½ miles),	51,672
Russell, chapter 221, Acts of 1915 (3 miles),	64,644
Wales, chapter 221, Acts of 1915 (4 miles),	66,674
Huntington, chapter 221, Acts of 1915 (5½ miles),	158,094
Northampton, chapter 221, Acts of 1915 (1½ miles),	35,951
Dracut, 1912, 1913, 1916, special acts (2½ miles),	104,095
Dracut county, on River Road, grading, etc.,	15,000
Hingham, Special Acts of 1916 (1¼ miles),	83,684
Plymouth, Special Acts of 1916 (Bourne Road), county,	2,500
Plymouth, State (1 mile),	2,500
Boston, Special Acts of 1907, Washington Street (1 mile),	133,592
Revere, 1910, 1912-13, Traffic Road,	281,611
Revere, 1916, continuation of Traffic Road (4 miles),	165,756
Ashburnham, 1915-16 (2 miles),	19,751
Dudley,	10,000
Grafton, chapter 221, Acts of 1915 (3 miles),	109,835
Oakham, chapter 221, Acts of 1915 (2¾ miles),	7,992
Petersham, chapter 221, Acts of 1915 (3½ miles),	24,786
Rutland, chapter 221, Acts of 1915 (2½ miles),	32,664
Upton, chapter 221, Acts of 1915 (1 mile),	38,050
Total (85 miles),	\$2,277,372

¹ See special acts elsewhere in report.

CONTRIBUTIONS PAID BY COUNTIES AND MUNICIPALITIES TOWARD THE
COST OF CONSTRUCTING STATE HIGHWAYS AND BRIDGES.

Barnstable County.

Barnstable, 1901-03 (north side),	\$10,650
Bourne, 1903,	4,000
Brewster, 1901,	12,500
Chatham, 1898-99, 1901,	6,000
Dennis, 1900,	2,500
Dennis, bridge, 1901,	2,500
Harwich, 1900-02,	6,800
Mashpee, 1913 (village road),	3,000
Orleans, 1903,	1,500
Provincetown, 1903,	2,084
Truro, 1906,	2,000
Yarmouth, 1894-1898,	38,000
Falmouth, 1904,	75,000

Berkshire County.

Becket, 1913-15 (towards road to town),	3,877
Cheshire, 1912-13 (on bridge),	1,400
Clarksburg, 1915 (bridge):—	
Town,	2,000
County,	2,000
Dalton, 1903,	1,000
Great Barrington, 1916, 1918 (Monument Mountain),	30,000
Hancock, 1903,	250
Hinsdale, 1901,	1,000
Lee bridge, 1915,	10,000
Lee, 1900, 1902,	3,226
Lenox, 1899 (about one-half cost of $2\frac{1}{4}$ miles),	14,000
North Adams, 1914 (on Mohawk Trail),	19,000
Pittsfield, Coltsville Road, 1909,	22,000
Richmond, 1897-1907 (about one-half cost of $3\frac{1}{3}$ miles),	30,000
Sheffield (Undermountain, three years), 1914-15-16,	7,687
Stockbridge, 1901, 1918,	16,000
Williamstown, 1903, on bridge,	5,975

Bristol County.

Acushnet, 1901,	2,500
Dighton, 1914,	5,000
Freetown, 1914,	8,000
Raynham, 1915,	2,500
Rehoboth, 1897,	1,200
Somerset, 1910,	1,000
Swansea, 1903,	1,000
Taunton (on bridge), 1906,	550

Dukes County.

Edgartown, 1915,	\$4,000
Gay Head, 1914 (county),	7,500
Oak Bluffs, 1915,	4,000
West Tisbury, 1898,	1,000

Essex County.

Beverly, 1906-07, 1914 (two-thirds of cost of $3\frac{1}{2}$ miles), . . .	28,515
Lawrence, River Road (county assessment), 1915, . . .	43,630
Methuen, River Road:—	
County,	38,782
Town,	14,543
Methuen, to Dracut line (county),	26,022
Wenham, 1903,	2,000
West Newbury, 1903,	828

Franklin County.

Bernardston,	300
Buckland, 1898, 1900 (on bridges),	2,000
Conway, 1912-13,	1,000
Deerfield, 1917-18,	20,000
Northfield, 1901-02, 1912, 1919,	13,300

Hampden County.

Blandford (toward cost of 4 miles), 13,600

Hampshire County.

Middlesex County.

Arlington, 1915 (grading, etc., part of cost of $1\frac{1}{4}$ miles),	31,782
Bedford, 1901-02 (on bridge),	2,317
Billericā, 1913 to 1918,	27,000
Billerica, county, 1916, 1918,	7,500
Billerica (on bridge):—	
Town,	10,000
County,	10,000
Holliston, 1916:—	
Town,	4,000
County,	4,000

Lexington, 1915-16 (grading, etc.),	\$6,884
Littleton, 1913,	2,000
Lowell, 1897 (boulevard, Lowell-Tyngsborough) (county),	11,000
Newton, 1901,	363
Sudbury, 1902 (on bridge),	800
Sudbury built (built before layout) ($\frac{1}{4}$ mile),	3,124
Townsend, 1896, 1898, 1902,	6,260
Tyngsborough, Lowell Road (county),	10,000
Wayland ($\frac{1}{4}$ mile),	2,850
Woburn (four years) (county),	16,000
On Lexington-Reading Road (city),	24,000

Nantucket County.

Nantucket, 1900,	3,000
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Norfolk County.

Avon, 1916 ($1\frac{1}{3}$ miles),	6,000
Braintree, 1915-16 ($2\frac{1}{2}$ miles),	10,000
Holbrook, 1916,	2,500
Milton, 1899, 1900,	7,000
Stoughton, 1914-15 (toward cost of State highway),	9,000
Walpole, 1916:—	
Town,	11,225
County,	675
Weymouth, 1915:—	
Town,	5,000
County (on Plymouth Pike),	5,000
Wrentham, 1914,	2,500

Plymouth County.

Bridgewater, 1913, 1917, 1919,	19,797
Duxbury, 1914-15 (Plymouth Pike),	16,600
East Bridgewater, 1913, 1915, 1917 (Bedford Street),	13,657
Kingston, 1916 (Plymouth Road):—	
Town,	2,000
County,	2,000
Lakeville, 1913,	4,000
Marion, 1901 (Weeweantic bridge),	1,000
Marion, 1914 (cut-off),	7,000
Middleborough, 1903,	6,000
Pembroke, 1915 (Plymouth Pike),	9,000
Rochester, 1913,	1,000
Wareham, 1914 (Onset bridge):—	
Town,	15,000
County,	10,000
Street railway,	5,000

Wareham, 1901 (on bridge),	\$2,500
Wareham, 1916, 1917 (Sawyer Road, 2½ miles):—	
Town,	12,600
Subscription,	2,700
County,	13,085
Wareham, 1914 (widening, etc.):—	
Town,	3,000
County,	3,000

Worcester County.

Ashburnham, 1910–13 (Winchendon Road),	7,140
Barre, 1914–15,	5,000
Barre, 1901 (on bridge),	1,100
Blackstone, 1914 (bridge),	8,500
Dudley,	5,000
Grafton, 1914,	3,000
Leicester, 1895,	6,478
Northbridge (five years, 1914–19),	20,000
Oakham, 1915,	1,000
Oakham, 1914 (county),	1,000
Petersham, 1912–13, 1915,	7,300
Rutland, 1913, 1915,	5,500
Shrewsbury, 1898,	300
Sutton, 1902–03,	3,000
Uxbridge, 1914 (bridge),	5,000
Uxbridge, 1916,	3,500
Warren, 1916,	2,050
West Boylston, 1915,	4,000
Westminster, 1913, 1918:—	
Town,	5,750
County, 1913,	3,250
Winchendon, 1904, 1913–15,	13,000
Total,	\$1,026,106

It is estimated that these contributions amounted to about 45 per cent of the cost of constructing 228 miles of State highway, and the total cost of a number of bridges.

Bridges built and paid for by the Counties and Municipalities and afterwards made State Highways by Special Acts.

Fall River (Brightman Street):—

Chapter 462, Acts of 1903,	\$1,000,000
Chapter 732, Acts of 1912, repairs,	64,934
Newburyport–Salisbury bridge (county),	325,000
	\$1,389,934

Repayments to the Commonwealth required under Certain Special Acts.¹

Egremont, Special Acts of 1914 (county repays),	\$4,500
Salisbury Beach, 1914,	1,025
Chester bridge, Special Acts of 1910 (county and town repay),	7,998
Hingham:—	
Due from town (37½ per cent),	31,381
Due from county (25 per cent),	20,921
Boston, 1907, Washington Street, one-half cost,	66,796
Dudley, special act (county repays),	2,500
Revere, special act, 1910 (county repays one-fourth),	70,404
Total,	<u>\$205,525</u>

Federal Aid paid or to be paid for Work already done on State Highways.

	Done.	Government's Proportion for Work done to Date.
Acushnet,	\$21,820	-
Hanover,	19,480	-
Newburyport Turnpike,	11,620	-
Danvers,	13,250	-
Windsor-Dalton,	-	\$21,200
Sandwich,	10,678	-
Athol-Petersham,	90,319	-
Braintree,	40,678	-
Barnstable,	26,062	-
Taunton,	42,320	-
Great Barrington,	31,573	-
Danvers-Peabody,	22,140	-
Greenfield-Shelburne,	-	15,785
	\$329,940	\$36,985
	36,985	-
Totals,	\$366,925	-

WORK DONE WITH MOTOR VEHICLE FEES.

It became evident in 1909 that for motor vehicle traffic many roads would be used as main through routes which formerly had little or no traffic, and in 1910 the Commission was authorized to expend 20 per cent of the net motor vehicle fees in constructing or improving in towns the main through routes or the main roads leading from one municipality to another.

¹ For special acts, see elsewhere in report.

Under this statute (chapter 525 of the Acts of 1910) \$3,000,000 has been appropriated by the towns and counties and used with the money allotted by the Commission, and many miles of road have been constructed, improved and maintained. This work is described elsewhere in this report in detail under "Co-operative Work."

The one great defect in the original act was, so far as this work is concerned, that there was no provision for proper maintenance by the towns after the roads were constructed, and that neither the Commission nor any one else had authority to order the town to maintain the road.

MAINTENANCE PROVIDED FOR.

Several years ago the Commission was authorized, by chapter 279 of the Acts of 1908, to direct the town, where a highway had been constructed under the "small town" act, to make the necessary repairs within a certain specified time.

If these repairs were not made within the time specified, then the Commission was authorized to have them made and to certify to the Treasurer of the Commonwealth the amount expended, and the money, not exceeding \$50 a mile a year, was to be collected from the town, together with its State tax, the money so collected being made available for use by the Commission for the maintenance of highways in addition to any further sum that might be appropriated therefor.

Some years later (chapter 774 of the Acts of 1913) a statute was passed authorizing the Commission to follow this same course of action in any town in which a town highway had been improved in whole or in part with money furnished by the Commonwealth, and the amounts to be collected back from the town were not to exceed \$50 per mile per year in towns whose valuation was less than \$1,000,000, not to exceed \$100 a mile a year in towns whose valuation was \$1,000,000 or over, but under \$2,000,000, and \$200 a mile a year in towns whose valuation exceeded \$2,000,000; but any balance expended on any one improvement could be certified and collected during the succeeding three years, the maximum amount collected in any one year being as above stated.

HELP FOR THE SMALLER AND POORER TOWNS.

The Commission clearly demonstrated in its first report that there were at least 200 towns that could not afford either to build or maintain any main through roads. The first appropriation was made for the construction of State highways in 1894, but it was not until 1900 that any steps were taken to help the poorer towns having no State highways.

In 1900, by chapter 432, the Commission was authorized to expend 5 per cent of the money appropriated for State highways in improving the roads in towns where no State highway had been built, but the expenditure in any one town was limited to "not exceeding forty per cent of its average expenditure for highways for the last three years."

In 1901, by chapter 433, this amount was increased, 5 per cent of the said appropriation being made available in towns whose valuation was under \$1,000,000, and an additional 5 per cent in towns whose valuation was over \$1,000,000, but all of this latter class of towns were required to contribute a sum equal to the amount allotted by the Commission.

Here, again, the same limitations were made; first, it was only available in towns in which no State highway had been constructed; and second, only 40 per cent of the town's average expenditure for highways for the previous three years could be appropriated for use in that town in any one year.

This law was not changed until 1908, chapter 279, when an additional 5 per cent of the amount appropriated for the construction of State highways was made available for use in towns whose valuation did not exceed \$1,000,000, provided the town contributed an equal amount of money. In all cases the money was to be expended and the work done under the direction and to the satisfaction of the Commission.

At this time the provision that this money could only be spent in towns in which no State highway had been constructed was eliminated. This was only fair, because in many towns the main route and State highway merely ran through a corner of the town, being of very little use to the town or its inhabitants; and what they needed was the main road leading to the village or to the railroad.

MAINTENANCE AND IMPROVEMENT OF HIGHWAYS UNDER THE PROVISIONS OF CHAPTER 155 OF THE ACTS OF 1918.

The Legislature in 1919 adopted the recommendation of the Commission, and made available \$200,000 for work under this act. It will take some years before this work is well organized and under way.

The work done this year in the different towns varied greatly. In a few towns in the wealthier counties practically every mile of much-used highway was shaped and kept maintained by dragging, etc., some of the worst sections being widened and improved. In a few towns 80 per cent of all their roads could be cared for in this way. These were towns that were selected to serve as object-lessons for their richer neighbors, to show what constant shaping, dragging and patching could accomplish for a little money.

The results were most gratifying and satisfactory. The Commission was often told by people who used the road, but who did not know the reason until they were told, that you could tell exactly where the town line was because of the condition of the road. In one town it was excellent; in the other, bad.

One town in particular that was commented on favorably because of the excellence of its roads was Boxford, and yet 6 out of the 9 municipalities by which it is surrounded are very much richer and better able to take care of their highways. Several of them have valuations which are three or four times that of Boxford, and one of them has a valuation nearly thirty times greater.

Roads which had been improved in former years, either under the "small town" act or with motor vehicle fees, were put in good repair and maintained.

Because only \$200,000 was available, not nearly enough to take care of all the towns that were eligible, the Commission refused to allot more than \$2,500 in any one town, and, except under very exceptional circumstances (in two or three towns for special reasons), refused to allot any money under this act for any town receiving aid from the State under any other act.

In most of the towns about two-thirds of all the roads were at least shaped and dragged, the brush cut, and necessary cul-

verts put in, and if there were only a few short stretches that broke up under the frost action a foundation was put under these sections.

The Commission allotted about \$150,000 for this year's work in 71 towns, and the towns appropriated a somewhat larger amount under the provisions of the law, so that over \$350,000 was available.

There were about 4,000 miles of highway in the towns that came in under the act, and many miles were shaped and dragged, the brush cut, and ditches and culverts opened. Many sections of road were widened, patched, graveled and drained.

CENTRAL ORGANIZATION NECESSARY.

One thing became evident as the work progressed, and that was that before effective and economical work can be done the town road departments must be systematized and organized. The foremen and men employed on this work should be kept constantly at work and be available at all times when needed.

WORK IN THE FIVE WESTERN COUNTIES, UNDER CHAPTER 221, ACTS OF 1915.

This act authorized the Commission to construct about 163 miles of highway on 17 different specified routes located in 38 towns and 1 city in the five western counties.

The Commission was to make the plans, and the county commissioners of the county in which the road was located were required to lay out the highway according to the plans, the county paying all land and grade damage.

The Legislature authorized the issue of \$2,000,000 bonds to be used to construct these highways. The act required the counties in which any of the highways were constructed to repay to the treasury of the Commonwealth 25 per cent of the expenditures in that county.

This will amount to \$500,000 in all, and is to be used in addition to the \$2,000,000 appropriated by the Commonwealth in completing the routes mentioned in the act.

All the bonds have been issued, and over \$1,600,000 has already been expended, and between 75 and 80 miles of road

have been constructed, or they will be. Work was begun on all but five of the towns and on all but two of the routes in 1915, 1916 and 1917. What had been accomplished on the various routes is fully set forth in our report for 1917, page 37 *et seq.*, and in the 1918 report, page 39 *et seq.*

As was stated in last year's report, work was discontinued on all but a few of these routes during the war because they were not of sufficient importance to justify the use of laborers on them when they were much needed for war work. Some work was done on the one or two routes that were on main through lines.

Since the act was passed in 1915 the price of labor has at least doubled, and the cost of materials, etc., has increased greatly. Consequently, as the Commission stated last year, the total amount available, \$2,500,000, will not be anything like sufficient to cover the cost of constructing all of these routes.

The cost of building a given highway has practically doubled since 1915, when this act was passed. Since then motor truck traffic has doubled or trebled, and it will very likely be necessary to construct much stronger and more expensive roads on any of the routes which will be much used after they are completed.

The Legislature and the committees, who advocated this bill and the construction of these routes, considered that gravel roads could be constructed and would be entirely adequate on at least two-thirds of all of the routes. The amount of money required was based upon the estimated cost of constructing this class of roads, and manifestly it is entirely insufficient if any modern improved highway is to be constructed. Including the \$500,000 that the counties are required to appropriate, about \$865,000 will be available in all for the completion of these routes.

On the main line between Northampton and Pittsfield (the Berkshire Way, Route 2) the Commission is using its regular State highway funds and has secured Federal aid as well, and about 3 miles of very expensive road over a new route with a much better grade is being built in Windsor. This work is about one-half done.

In Cummington, on this same route, the Commission has secured Federal aid, and will use its regular State highway funds in the construction of about $4\frac{1}{2}$ miles of highway.

In Athol and Petersham, on the Worcester-Athol road (Route 12), the Commission has secured Federal aid and has used its regular funds, and 7 miles of tar macadam 18 feet in width and on an adequate foundation has been constructed. This highway, just over 7 miles in length, cost \$190,000, or \$27,000 a mile, to construct.

Deducting these 18 miles from the 83 miles that still remained to be constructed under the western counties act leaves 65 miles of road not yet constructed.

To construct a gravel or dirt road of suitable width on any reasonable grade, with adequate foundations and drainage, would cost at to-day's prices at least \$20,000 a mile, or \$1,300,000, or about \$500,000 in excess of all the money available.

To build the kind of road that can withstand the traffic that will use the different routes will probably cost about \$2,000,000 at to-day's prices, or at least \$1,000,000 more than the money now available. If these routes are to be completed, this money must be made available from some source.

FEDERAL AID IN CONSTRUCTING HIGHWAYS.

By an act of Congress, approved July 11, 1916, entitled "An Act to provide that the United States shall aid the States in the construction of rural post roads, and for other purposes," the United States government made available \$75,000,000 to be used in aiding the States to construct certain roads which might be agreed upon between the highway departments of the various States and the Secretary of Agriculture.

In order to take advantage of this act the Legislature had to accept the provisions of the act as a condition precedent to the participation of the Commonwealth in the benefits thereof, and also to authorize the Highway Commission to do all the necessary acts that were required by the act of Congress and the regulations of the Secretary of Agriculture. This assent and authority were given by chapter 67 of the General Acts of the year 1917.

By chapter 18 of the General Acts of 1918 the Commission was authorized to use any money heretofore appropriated for the construction of specific highways or routes, the money received from the motor vehicle fees or from any of the money that was repaid by the municipalities, as well as any money that was paid to the State by the Federal government on account of any Federal-aid roads that were built, for use in securing the money from the government.

The Commission was also authorized to make agreements with the Federal government, when it had an agreement with any county, city or town, to pay any money toward the construction or the improvement of a highway, providing for the expenditure of that money as well as money which came from State funds. This was in addition to money which was available at any time for either the construction or maintenance of State highways.

By chapter 18 of the Special Acts of 1918 the Legislature authorized the Commission to expend any unexpended balances that were left from the money appropriated for the construction of State highways; also unexpended balances of appropriations which had been made for the construction of specific highways or routes, these balances to be expended during the years 1918, 1919 and 1920.

The amount that was allotted to the State of Massachusetts for the fiscal year ending June 30, 1917, was \$73,850.95, for the fiscal year ending June 30, 1918, \$147,701.90, making a total of \$221,552.85. We were notified that the amount that would become available for the year ending June 30, 1919, would be \$221,261.85.

The act of Congress provides that one-half the cost of constructing any project which may be agreed upon between the Secretary of Agriculture and the State Highway Department shall be provided for from the State or local funds, and that the amount that the Federal government shall pay on any mile of road shall not in any event exceed \$10,000 a mile for its half. The Federal government will also pay one-half the cost of constructing bridges, provided they are on a road that is agreed upon.

The Secretary of Agriculture requested the various States, in

the first instance, to submit a general statement embodying a program of tentative projects in order to show the general scheme which the State intended to adopt in the expenditure of the Federal-aid money. This general scheme was drafted and was submitted to the Secretary of Agriculture by the Commission early in March, the scheme covering 21 different roads, all of them upon relatively important through routes. The general scheme was approved, and the Commission was notified to submit specific project statements.

This first Federal aid act was amended by Congress by "An Act making appropriations for the service of the Post Office Department for the fiscal year ending June 30, 1920, and for other purposes," approved Feb. 28, 1919.

Under this act \$75,000,000 a year additional was made available for use in the various States for two years, and \$50,000,000 additional for one year, and the amount allotted to Massachusetts for the fiscal year ending June 30, 1920, was \$1,105,324.95, making the total available for that fiscal year, \$1,400,078. The amount for the fiscal year ending June 30, 1921, from the two appropriations, is about \$1,400,000. The total amount which Massachusetts will receive from the two appropriations is a little over \$4,000,000.

The provision, requiring the States to provide an amount of money at least equal to the amount provided by the government, remained unchanged. It had been found that under war prices the main roads in many States could not possibly be constructed for \$20,000 a mile, of which the government payment was limited to \$10,000 a mile, if they were to be made adequate to carry modern traffic for many years, especially the motor trucks.

Very many miles of well-constructed pavements, even of bituminous and others of the older types, were practically destroyed during the war, when the government sent a very large number of loaded motor trucks over them. Miles of improved roads, that had been considered to be well built and found to be entirely adequate up to that time, and which had cost \$20,000 or more a mile to construct, were broken through and deeply rutted, and required rebuilding because of this extremely heavy traffic. This was especially true of the main

roads leading to the shipping ports, in Maryland, New York, New Jersey, etc. In many cases the failure was due to lack of adequate foundations, the highway having been constructed on a soil that did not have sufficient bearing capacity to support the road.

In others it was due to the top surface not being strong enough to withstand the constant wear and strain of so many trucks with heavy loads going over them at a very considerable speed. This fact was recognized by the authorities in Washington, and the act was amended so that the government could pay one-half the cost not exceeding \$20,000 a mile, in place of the former limit of \$10,000 a mile.

The Federal authorities and the State departments as well both desired to secure a system of main trunk highways, interstate as well as the main roads in the States themselves.

This was of great importance to the whole country, not only to promote commerce and intercourse, but was essential from a military point of view. The interpretations put upon the first act had greatly hampered the States in getting Federal aid projects approved on important roads. Many of them were not on rural free delivery routes, and meritorious projects were, therefore, often rejected by the Secretary of Agriculture.

The 1919 act of Congress amended the older act so that roads which could be made suitable for the transporting of the United States mails could be built which connected with a rural free delivery route or other route over which the mails were transported, provided only that the gap that was to be constructed did not exceed 10 miles in length on any one project. This made the construction of many very important links in main through highways possible.

The total amount that Massachusetts will receive from the Federal government up to and including the fiscal year ending June 30, 1921, is about \$4,000,000. To secure this amount the Commonwealth must put \$4,000,000 with it. The Commission has informed the committee on ways and means of the Legislature that if the State would authorize the Commission to use all unexpended balances of former appropriations, which was done, and would also appropriate \$1,000,000 a year for the construction of State highways in 1919, 1920 and 1921, the Com-

mission could secure the additional million dollars required in part from its former balances, and if necessary from money appropriated by the counties and municipalities. The Legislature appropriated the necessary \$1,000,000, in 1919, and the Commission's recommendation that \$1,000,000 be appropriated in 1920 will undoubtedly be adopted.

FEDERAL AID PROJECTS.

Twenty-nine different projects, and one extension of a former project, had been submitted to the Secretary of Agriculture on Oct. 30, 1919, in forty-four different towns.

These projects required the construction of over 95 miles of State highway, all on main or secondary through routes of great importance, and when these highways were constructed the Commonwealth was entitled to secure from the Federal government about \$1,480,000. The entire work had been completed on four of these projects on Oct. 30, 1919, and work had been commenced and is practically already completed, if not entirely completed, on twelve other projects, making sixteen in all that are practically completed.

Contracts have been advertised and let on six other projects, and on several of these a very considerable amount of work has been done. On three other projects the contract either has been or will be advertised at once. These projects cover important main through routes in the counties of Berkshire, Hampshire, Franklin (one is pending in Hampden), Worcester, Middlesex, Essex, Norfolk, Plymouth, Bristol and Barnstable.

These projects and the progress on each, as of Oct. 30, 1919, are shown in the following list:—

Statement of Federal-aid Road Projects.

TOWN.	Miles.	Amount of Federal Aid.	Remarks.
1. Acushnet-Fairhaven, . . .	2.182	\$21,820 00 ¹	Work completed.
2. Hanover,	2.708	19,480 36 ¹	Work completed.
3. Malden, Melrose, Saugus, . . .	1.162	11,620 00 ¹	Work completed.
4. Danvers,	1.325	13,250 00 ¹	Work under way.
5. Windsor-Dalton,	3.240	32,400 00 ¹	Work under way.

¹ Signed agreements.

Statement of Federal-aid Road Projects — Concluded.

TOWN.	Miles.	Amount of Federal Aid.	Remarks.
6. Sandwich,	1.818	\$10,678 02 ¹	Work under way.
7. Cummington,	4.659	86,816 53	Work under way.
8. Athol-Petersham,	7.016	90,319 00 ¹	Work under way.
9. Saugus,	3.122	65,472 27 ¹	Work under way.
10. Braintree,	2.420	40,687.37 ¹	Work under way.
11. Concord, Acton, Littleton,	4.849	79,106 22 ¹	Work under way.
12. Ipswich,	2.173	21,851 50 ¹	Work completed.
13. Littleton-Groton,	6.451	130,524 25	Project approved.
14. Barnstable,	3.345	26,062 57	Work under way. Specifications approved.
15. Norwell-Hingham,	4.380	61,169 35	Bids to be received Nov. 5, 1919. Specifications approved.
17. Lynnfield-Peabody,	1.794	32,387 93	Project approved.
18. Lunenburg,	2.797	55,940 00	Project approved.
19. Taunton,	2.116	42,320 00 ¹	Work under way.
20. Tewksbury-Wilmington,	2.909	35,211 82 ¹	Work under way.
21. Pittsfield-Hancock,	3.637	72,740 00	Work under way.
22. Greenfield-Bernardston,	6.360	62,944 31	Project approved.
23. Great Barrington,	2.124	31,573 87	Work under way. Specifications approved.
24. Seekonk,	2.756	19,527 75 ¹	Work under way.
25. Billerica, . . . . .	.597	36,336 35	Project approved.
26. Greenfield-Shelburne,	9.558	209,156 55	Work under way on one section; 5.134 miles. Specifications approved.
27. Hamilton-Wenham,	2.420	28,519 53	Project approved.
28. Lanesborough,	3.680	70,555 38	Work under way on one section, about 1 mile in length. Specifications approved.
29. Ware,	2.626	47,324 80	
31. Danvers-Peabody,	1.107	22,140 00	Extension.
Total,	95.331	\$1,477,935 73	

¹ Signed agreements.

FEDERAL DISTRIBUTION OF ROAD EQUIPMENT.

Section 7 of the post office appropriation bill passed in February, 1919, provided that the Secretary of War might transfer to the Secretary of Agriculture, for distribution among the highway departments of the several States, such available war material, equipment and supplies as might not be needed by the War Department, said equipment to be used by the several States on roads constructed in whole or in part by Fed-

eral aid, and the distribution to be made on substantially the same basis as the distribution of Federal aid funds.

Under this act the Secretary of Agriculture, through the Bureau of Public Roads, has notified the Commission from time to time of equipment and materials that were available for distribution, and has asked the Commission to signify what part of such equipment was wanted by the State of Massachusetts.

Some of the States do a large portion of their highway work by force account or with convict labor. These States naturally require a large amount of equipment, but in this Commonwealth it has been the practice to do the greater portion of highway work by contract. Nevertheless, the Commission does practically all the maintenance work in this State on force account, and does some construction and reconstruction by the same method; hence it seemed advisable to secure such equipment as was available and which appeared necessary for the work that was anticipated might be done in this State in the next few years.

The equipment to be distributed consisted largely of motor trucks, but there was also available for distribution other equipment, such as concrete mixers, pile drivers, steam shovels and smaller machinery and tools.

The Commission considered that they might use 75 trucks of varying capacity, and consequently made request to the Bureau of Public Roads for this allotment. Request was also made for a number of passenger automobiles and for road machinery of various types, including a few concrete mixers, tractors, pile drivers, portable forges and numerous other articles of equipment.

Up to the end of the fiscal year, Nov. 30, 1919, the Commission had received 83 trucks of 2, 3 and 5 ton capacity and has also received notice of allotment of 127 additional trucks, none of which have yet been received.

Practically all of these trucks are new, and none of them are equipped with dumping bodies, most of them having chassis only. These trucks have been found useful and economical, particularly in view of the fact that it is now difficult to secure good teams. Several of them have been equipped with dump-

ing bodies, and it is proposed to equip the greater portion of the trucks that are received with such bodies; some, however, will be equipped with tanks and distributing devices for use in construction and maintenance with bituminous material.

During the police strike, late in the year, the State military authorities requested the use of some of these trucks, and about 30 of them were utilized in carrying men, supplies and materials during the strike.

While the trucks that were assigned to this State were practically all new and in first-class condition, this was not true of the passenger vehicles assigned to the State. Early in the summer about 25 passenger vehicles were assigned, but upon investigation it was found that they were in such condition that they could not be utilized without large expenditure, and even with large expenditure they did not appear of such quality that they would remain serviceable without constant repair. Consequently they were declined, but it is anticipated that some reasonably good passenger vehicles will be available for distribution to this State later.

Practically none of the other machinery has yet been received, but it is anticipated that considerable machinery will be received in the near future.

EXPENDITURES AND APPROPRIATIONS UNDER SPECIAL ACTS, 1903 TO 1919, INCLUSIVE.

From 1903 to 1918, inclusive, the Legislature has passed 68 special acts or resolves, appropriating certain sums of money to be used on particular highways or routes. For several of these highways several special appropriations have been made. About 130 miles of improved highways have been constructed with the money available. A few of them have been for very expensive short stretches of highway, like the Lynn shore road connecting the metropolitan parkway in Revere with Lynn. One hundred thousand dollars was appropriated in 1903 for this highway of about 1 mile in length, in Lynn.

Three hundred thousand dollars was appropriated in 1912 and 1913 for the construction of the Revere traffic road to Revere Street, about 2 miles in length, and \$200,000 more was appropriated in 1916 to continue this traffic road about $1\frac{1}{4}$

miles to connect with the metropolitan park boulevard and Winthrop Avenue.

This makes \$600,000 that has been appropriated for the construction of a highway on a main line between Lynn and Boston, about $4\frac{1}{4}$ miles in length.

Special appropriations were made to build expensive sections on main through routes that could not be built by the Commonwealth with its ordinary funds in any reasonable length of time. Seventy-five thousand dollars was appropriated in 1908 and 1909 for the construction of the new route over Jacobs Ladder on the main line between Springfield and Pittsfield.

One hundred and fifty thousand dollars was appropriated in 1911 and 1912 for the survey and construction of the Mohawk Trail over Florida Mountain, on the main line between Greenfield and North Adams and Williamstown, and so on to connect with main highways to points in New York and Vermont.

In these cases the Commission had informed the Legislature that if these sums of money were made available the Commission could and would provide enough money from its regular funds to complete the route in a few years, and this has been done.

A large proportion of the special appropriations have been made, requiring the construction or improvement of highways that were of very little importance except locally, and some of them were not even of any local importance; but their construction was desired by individual members of the Senate or House. The Commission invariably, perhaps sometimes inadvisably, informed the committees of the Legislature exactly how important or unimportant the particular project was in its opinion.

In all, by these 68 special appropriation acts, the Legislature from 1903 to 1918, inclusive, has appropriated \$3,973,500. Of this amount the Commission has already expended \$3,310,362. In some cases the work will go on and the balance of the money will be expended; in others the work is completed, and there has been an unexpended balance left in the treasury of the Commonwealth.

The following is a schedule of these special acts:—

SPECIAL ACTS.	Appropriation.	Expenditure.	Road.
1903, chap. 384, . . .	\$100,000	\$99,999 65	Lynn shore road, State highway.
1904, chap. 100 (Res.), . .	3,000	2,832 70	Middlefield.
1907, chap. 574, . . .	165,000	133,592 53	Washington Street, Boston.
1908, chap. 616, . . .	50,000	50,000 00	Jacobs Ladder.
1909, chap. 511, . . .	25,000	25,000 00	Jacobs Ladder.
1909, chap. 136 (Res.), . .	20,000	20,000 00	Parker River bridge.
1910, chap. 578, . . .	50,000	49,948 01	Marblehead Breakwater.
1910, chap. 574, . . .	20,000	19,999 58	Chester bridge.
1910, chap. 646, . . .			
1912, chap. 697, . . .	300,000	281,611 22	Revere Traffic to Revere Street.
1913, chap. 639, . . .			
1911, chap. 677, . . .	150,000	149,997 71	Mohawk Trail.
1912, chap. 646, . . .			
1911, chap. 746, . . .			
1912, chap. 454, . . .	15,000	24,567 81	Salisbury Beach (damages extra, 1914).
1914, chap. 659, . . .			
1911, chap. 678, . . .	30,000	29,968 82	Shelburne Mountain.
1912, chap. 677, . . .			
1911, chap. 476, . . .	3,500	2,989 65	Truro.
1911, chap. 744, . . .			
1912, chap. 716, . . .			
1912, chap. 717, . . .	87,000	75,304 35	Brightman Street and Newburyport bridges.
1912, chap. 732, . . .			
1912, chap. 647, . . .	105,000	94,095 51	Dracut-Methuen river road.
1913, chap. 713, . . .			
1911, chap. 711, . . .			
1912, chap. 627, . . .	40,000	39,958 87	Dalton-Goshen.
1913, chap. 731, . . .			
1914, chap. 502, . . .			
1912, chap. 703, . . .	20,000	20,000 00	Ware-West Brookfield.
1913, chap. 776, . . .			
1913, chap. 730, . . .	20,000	19,941 21	Hinsdale to Chester, through Middlefield.
1914, chap. 503, . . .			
1913, chap. 88 (Res.), . .	5,000	4,926 28	Province land road.
1913, chap. 128 (Res.), . .			
1914, chap. 78 (Res.), . .	20,000	20,000 30	Williamstown-Pittsfield river road.
1913, chap. 57 (Res.), . .	500	495 61	Investigation, North Beacon Street, Boston.
1913, chap. 778, . . .	75,000	65,004 90	Humphrey Street, Swampscott.
1914, chap. 668, . . .	10,000	10,000 00	Rutland to Holden.

SPECIAL ACTS.	Appropriation.	Expenditure.	Road.
1914, chap. 711,	\$20,000	\$19,988 43	Milford-Hopkinton.
1915, chap. 232,			
1916, chap. 219,			
1914, chap. 733,	15,000	15,000 00	Egremont.
1914, chap. 756,	10,000	10,000 00	Becket-Washington-Hinsdale.
1914, chap. 779,			
1916, chap. 202,	25,000	21,715 87	Southbridge, Dudley, Webster.
1916, chap. 211,			
1914, chap. 754,	10,000	9,960 02	New Marlborough.
1915, chap. 196,	38,000	37,428 31	Concord Avenue, Cambridge.
1915, chap. 229,	10,000	9,751 83	Ashburnham.
1915, chap. 230,	20,000	20,000 00	Norton-Taunton.
1916, chap. 204,			
1915, chap. 242,	14,000	11,832 45	Mashpee-Barnstable.
1915, chap. 257,			
1916, chap. 212,	20,000	19,040 48	North Brookfield, Barre Plains.
1916, chap. 203,	10,000	10,563 97	Black North, Dracut.
1916, chap. 205,	10,000	8,049 32	Plymouth-Bourne.
1916, chap. 206,	10,000	10,000 00	Pelham Hill.
1916, chap. 210,	10,000	10,001 62	Gardner-Rutland.
1916, chap. 214,	10,000	10,000 31	Ashburnham-Ashby, Rindge road.
1916, chap. 213,	200,000	32,248 44	Hingham.
1916, chap. 215,	5,000	5,000 00	Lunenburg.
1916, chap. 217,	10,000	7,829 69	Phillipston-Templeton.
1916, chap. 230,	200,000	165,756 55	Revere Traffic from Revere Street, West.
1916, chap. 216,	10,000	527 37	Sandwich-Mashpee.
1917, chap. 112 (Res.), . .	500	198 82	Salem, survey.
1917, chap. 266,	2,000	1,166 62	Damages on State highway.
1915, chap. 221,	2,000,000	1,634,068 00	Under western counties act.
Totals,	\$3,973,500 ¹	\$3,310,362 71	

¹ \$500,000 more to be paid back by counties, not included in total.

Under the provisions of chapter 221, Acts of 1915, an appropriation of \$2,000,000 was made for the construction and improvement of seventeen different routes in the five western counties. Each of these counties is required to repay to the treasury of the Commonwealth one-quarter of any money that is expended in that county (the same provision that is made when State highways are constructed).

This will require these counties to pay \$500,000 back to the Commonwealth, and the act authorized this Commission to expend that money, either in completing these routes or in improving certain town roads.

SPECIAL ACTS UNDER WHICH THE TOWNS OR COUNTIES WERE REQUIRED TO REPAY A PORTION OF THE COST TO THE COMMONWEALTH, OR TO PAY CERTAIN ADDITIONAL MONEY THEMSELVES.

This list is probably not complete, as some of the earlier records may have been overlooked:—

1907, chap. 574 — Washington Street, Boston.

Construction cost,	. . . . .	\$133,592
Boston repaid one-half,	. . . . .	\$66,796

1910, chap. 578 — Marblehead Breakwater.

Cost, 1910 and 1911,	. . . . .	49,948
Essex County repaid 25 per cent,	. . . . .	\$12,974
Marblehead repaid 10 per cent,	. . . . .	4,944

Total,		\$17,918

1910, chap. 574 — Chester bridge.

Cost, 1910 and 1911,	. . . . .	19,999
Hampden County repaid 35 per cent,	. . . . .	\$6,999
Chester repaid 5 per cent,	. . . . .	999

Total,		\$7,998

1911, chap. 746; 1914, chap. 659 — Salisbury Beach Road.

Cost, 1911, 1912 and 1913,	. . . . .	24,657
Essex County repaid 35 per cent,	. . . . .	\$8,589
Salisbury repaid 10 per cent,	. . . . .	2,456

Total,		\$11,045

1913, chap. 778; 1914, chap. 398 — Humphrey Street, Swampscott.

Cost to State, 1913 to 1917,	65,000
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1914 Commission authorized to expend the unexpended balance of the \$75,000 appropriated in constructing the approaches.

The county of Essex was to lay out the road and to pay all land damages, and was authorized to spend \$100,000.

The town of Swampscott was to build sidewalks, do all the grading, build retaining walls, move all pipes and underground structures, put in all drainage, and was originally authorized to borrow \$50,000. It was authorized to expend more money later.

The street railway company was to construct a double track and to pave between the tracks and 18 inches on each side.

The Commission was to pave on each side from 18 inches from the tracks to the curbstone.

A good wood block pavement was laid upon a concrete base.

This whole highway cost about \$300,000.

1914, chap. 733 — Molasses Hill, Egremont.

Construction cost, 1914 and 1915,	\$15,000
Berkshire County repaid	\$4,500

1914, chap. 754 — New Marlborough.

Cost, 1915 and 1916,	9,960
Berkshire County repaid 25 per cent,	\$2,490

1915, chap. 196 — Concord Avenue, Cambridge.

Cost, 1915 and 1916,	37,428
Cambridge repaid 37½ per cent,	\$14,035
Middlesex County repaid 25 per cent,	9,357
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Total,	\$23,392
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1914, chap. 779 — Southbridge—Dudley—Webster road.

Cost,	10,000
Worcester County repaid 25 per cent,	\$2,500
Southbridge appropriated \$5,000 additional for the work.	

1916, chap. 205 — Plymouth—Bourne road.

Commission authorized to expend	10,000
Plymouth County had to provide	\$2,500
Barnstable County had to provide	2,500
The Commonwealth paid one-half,	5,000

1916, chap. 213 — Hingham.

Commission authorized to expend	200,000
Amount expended, 1916, 1917, 1918 and 1919,	83,684
When work is completed Hingham is to repay 37½ per cent and Plymouth County is to repay 25 per cent.	

1915, chap. 221 — Highways in the five western counties.

Appropriation,	. . . . .	\$2,000,00
Counties repay 25 per cent, which is also made available,	. . . . .	500,000
Amount expended to Nov. 30, 1919, \$1,635,000.		

1918, chap. 236 — Highway in city of Leominster.

Expenditure authorized,	. . . . .	20,000
Leominster was to pay,	. . . . .	\$10,000
County of Worcester,	. . . . .	5,000
Commission (from motor vehicle fees),	. . . . .	5,000

1919, under 11 special acts.

Commission authorized to expend from the motor vehicle fees in 15 towns and 3 cities,	. . . . .	261,000
Towns pay or repay,	. . . . .	\$44,750
Counties repay,	. . . . .	56,250
Commission pays,	. . . . .	101,000

Total expenditure authorized,	. . . . .	\$4,371,584

When the work is completed the repayments to the treasury of the Commonwealth will be as follows:—

From cities and towns,	. . . . .	\$218,980
From counties,	. . . . .	663,659
One city pays,	. . . . .	5,000

Total repayments,	. . . . .	887,639

Net amount paid by the Commonwealth, \$3,483,945

To this should be added the amounts expended for Humphrey Street, Swampscott, by the county of Essex, the town of Swampscott and the street railway company, amounting to about	. . . . .	225,000
Repayments by cities, towns and counties,	. . . . .	887,639

Making total cost of the improvements made under the various special acts, \$4,596,584

PROTECTION OF HIGHWAYS AND BRIDGES FROM EXCESSIVE LOADS.

The Legislature in 1919, by chapter 222, authorized this Commission, or the local authorities having control of any bridge on any earth, sand or gravel road, to erect and maintain notices at each end of the bridge, legible at a distance of 50 feet, stating

the maximum weight of vehicle with load which the bridge will safely carry to be 6 tons.

The owner of any vehicle using such bridge is made responsible for all damages resulting thereto, if the weight of the vehicle and load exceeds 6 tons, and the amount of the damage may be recovered in an action at law by the authority charged with the maintenance of the bridge.

There is also a fine of not less than \$50 nor more than \$100 imposed upon the operator of any vehicle, the weight of which with its load exceeds 6 tons, that causes damage to any bridge posted as aforesaid.

This law or a similar law has been advocated by the Commission for many years, because it became more and more evident year by year, with the constantly increasing use of heavy motor trucks and their use of the country roads, that if some limitation was not made and enforced limiting the weight of vehicles which could use our country roads and bridges, great damage would result.

For many years the weight of vehicles and loads which could use our bridges was supposed to be limited to 6 tons, but the law had no teeth; it merely prohibited the owner whose vehicle and load exceeded 6 tons from recovering damages from the municipality if the bridge broke and any damage to person or property resulted therefrom.

The proper authorities were also authorized by law to post bridges, limiting the weight of any vehicle and load using them to 3 tons, and also the municipality was relieved from liability to pay any damages if the bridge was broken.

There was, however, no way of making the owner of the vehicle which destroyed a bridge by moving an excessive load over it responsible for the damage he had caused to a structure built at public expense. There was no penalty put upon the operator of the vehicle.

This new law should prove of great benefit. It will, if adequately enforced, prevent the destruction of hundreds, if not thousands, of bridges on our country roads, and also, incidentally, the destruction of or great damage to the roads themselves that have cost millions of dollars and have taken many years to build.

A great many bridges and culverts were destroyed by heavy trucks this year. The small country towns cannot afford to build bridges adequate to carry vehicles whose total weight exceeds 6 tons. The State cannot afford to build them, either, except on a few main routes. A very few figures will be convincing.

A modern highway adequate to carry, say, 12 to 15 tons, will cost to-day from \$30,000 to \$40,000 a mile to build. If bridges of any great length were required, the expense for each bridge would be from \$30,000 upward.

Motor trucks contribute about 7 per cent of the total traffic on most of our through highways. The motor trucks having a carrying capacity greater than 3 tons constitute only a small percentage of the total number of trucks (probably not over 15 per cent).

About 1 per cent of the traffic using through routes, therefore, will be trucks whose total weight, vehicle and load, exceeds 6 tons. Taking a main highway carrying 1,000 vehicles a day on the average, about 10 only would exceed 6 tons weight for vehicle and load. It is evident that the owners of these 10 trucks should not be allowed to destroy the road, even if we assume or they assume that they can save a little money by using the heavy truck. The road is entirely adequate to carry all ordinary traffic for many years.

SPECIAL ACTS PASSED IN 1919.

The Legislature in 1919 passed eleven special acts authorizing the Commission to construct or improve certain specified highways in 15 different towns and 3 cities. The total amount which it was authorized to expend was \$251,000, but in all of these acts it was specified that the necessary money should be obtained out of the money appropriated by Item 336 of the general appropriation bill (motor vehicle fees).

It was understood and agreed by the Governor, the committees of the Legislature, and the senators and members interested in the various projects that no money should be expended under the provisions of these acts until the total amount of the net motor vehicle fees collected amounted to the Commission's estimate, given to the Legislature, of the amount necessary for the maintenance and reconstruction of State highways and of

certain through routes. Then if enough more money was collected the sums of money appropriated by these special acts should be available. Evidently this fact could not be ascertained until very late in the year. The amount of money collected from the motor vehicle fees was sufficient to permit the Commission to expend the various sums of money which had been tentatively appropriated.

Small sums of money for surveys, etc., have been made in four places. In three others, sums varying from \$270 to \$642 have been expended, and in three more, \$1,400, \$2,500 and \$2,800 have been spent. In most of these acts the county in which the highway was located is required to repay to the Commonwealth from 40 to 25 per cent of the total cost. In four the towns are required to repay one-third, one-quarter or one-fifth. In one the city is required to repay one-half of the cost. In one the town has provided \$10,000 additional money. The sum of \$261,000 was made available in all (including Princeton's \$10,000), and of this amount the towns pay or repay to the Commonwealth \$69,750, and the counties are required to repay to the Commonwealth \$70,417, making their total payments \$140,167, thus leaving the Commonwealth \$120,833 to pay from the net motor vehicle fees.

<i>Special Acts passed in 1919.</i>	<i>Appropriation.</i>
Chap. 231 (Spec.), Leominster,	\$24,000
Of this amount the city of Leominster pays \$12,000, and the county of Worcester pays \$6,000.	
Chap. 232 (Spec.), Holland-Brimfield,	10,000
The county of Hampden repays 25 per cent.	
Chap. 233 (Spec.), Princeton-Holden,	20,000
The county of Worcester repays 25 per cent, and the town of Princeton provides an additional \$10,000.	10,000
Chap. 240 (Spec.), Middlefield,	10,000
Chap. 335 (Gen.), Westborough-Grafton,	12,000
The county of Worcester repays 33 per cent, and each town repays 33 per cent of the amount expended in that town.	
Chap. 336 (Gen.), North Brookfield,	25,000
The county of Worcester repays 25 per cent, and the town repays 25 per cent.	
Chap. 337 (Gen.), Hubbardston-Rutland,	50,000
The county of Worcester repays 40 per cent, and each town repays 20 per cent of the amount expended in that town.	

Chap. 338 (Gen.), Holyoke,	\$50,000
City pays 50 per cent; county, 25 per cent; State, 25 per cent.	
Chap. 339 (Gen.), Milford-Southborough-Hopkinton,	10,000
The county repays \$2,500, and Milford pays \$2,500.	
Chap. 340 (Gen.), Dracut-Methuen,	20,000
The county of Essex repays 25 per cent.	
Chap. 348 (Gen.), Norton,	20,000
The county of Bristol repays 25 per cent.	

	\$261,000

RECOMMENDATIONS FOR LEGISLATION, 1920.

The Commission in November made four recommendations requiring legislation during the coming year, and submitted drafts of the statutes which should be enacted to accomplish the end desired.

First. — The Workmen's Compensation Act should be extended to take in and provide compensation for men who may be classified as engineers and who are injured in the performance of their duties. "Procedure under this act and the jurisdiction of the industrial accident board shall be the same as under the provisions of said chapter seven hundred and fifty-one, and the commonwealth . . . shall have the same rights in proceedings under said chapter as the association thereby created. The treasurer and receiver general . . . shall pay any compensation awarded for injury to any person in its employment upon proper vouchers without any further authority."

Second. — The Commission recommended that motor vehicles registered in an adjoining State, which were required by law to be registered also in this Commonwealth, should be authorized to display not only the number plate issued to them here, but also the number plate of their home State; that the number plates of both States should be displayed as required by law, on the front and rear.

Quite a large number of motor vehicles that are continually operated in two States are required by law to be registered in both States. The law at present prohibits the display of more than one number plate on the front or on the rear. Strictly speaking, the operator should stop on the boundary line and take off the numbers of one State and put on those of another, or he is liable to prosecution. In practice this would cause

great delay and inconvenience; consequently this law is very seldom if ever enforced. It is evident that the number plate of either State will identify the vehicle. This is all that should be required by law.

Third. — The Commission recommended that the length, width and height of all vehicles using the highways should be limited by law, in the same way that the dimensions of motor vehicles and trailers were limited in 1919 by chapter 252, on recommendation of the special commission.

Fourth. — What was meant by a "trailer" under chapter 294 of the General Acts of 1919 seemed somewhat doubtful, and many questions had arisen in consequence. The Commission therefore recommended the passage of an act to make entirely clear what is intended by the word "trailer" under the statute.

It recommended that the term "commercial trailer" should include "every vehicle which is used for conveyance of commodities for use in connection with commerce, which has no motor power and which is moved by a motor vehicle."

GUIDE BOARDS.

The Legislature in 1919, by chapter 221, directed the Commission to erect signs at the town and city boundaries on important main routes. Under the act the posts were required to be made of concrete. The Commission has had a large number of designs made for such posts, has had certain sample posts made, and has secured prices for various kinds of signs, including cast iron with raised letters, enamel signs and the like.

The subject was taken up with the Director of Prisons, who had some designs made and who thought at one time that the posts and the signs could be made at the State Prison, but after further investigation he decided late in the fall that he could not undertake the work.

It seems probable that under this act some four posts will be required in each town, although some towns require more and some less. This will mean about 1,500 posts in all, but it will practically provide for eight main roads. Each post will have the name of two municipalities.

The Commission has had certain sample signs made and has secured prices, as stated before, but decided that on work of

this magnitude it would be better to advertise and secure bids, not only on plans and designs which it might make up, but also that bids be submitted for both posts and signs, the designs to be made by the manufacturer; in this way the best possible sign will be obtained.

AUTOMOBILE DEPARTMENT.

Registrations, Licenses, Fees.

During the year 1919 there were 205,372 automobiles registered, also 41,810 trucks and commercial vehicles, 13,698 motorcycles, and 2,496 manufacturers' and dealers' registration certificates issued.

The increase in the registration of motor vehicles from 1915 to 1919 is clearly shown by the following table:—

Automobiles, Trucks and Commercial Vehicles.

	1915.	1916.	1917.	1918.	1919.	Per Cent Increase, Four Years.
Trucks,	12,053	18,194	25,505	33,011	41,810	247
Automobiles,	90,580	118,615	145,801	160,486	205,372	127
Motorcycles,	9,520	10,713	10,956	12,862	13,698	44

The amount of fees collected for automobiles, trucks and commercial vehicles was \$2,125,269.50, or an average of \$8.52 for each of these vehicles registered, the average fee collected in 1918 having been \$8.95.

During the year 63,529 operators' licenses were issued and 161,389 operators' licenses were renewed. The number of chauffeurs' licenses issued was 15,357, and the number of chauffeurs' renewals issued was 57,687. Therefore there are 297,962 persons licensed in this State, an increase of 62,822 over the number licensed in 1918.

The total amount collected from registration fees, license fees, sundry receipts, interest, etc., was \$3,288,379.79, including \$515,601 on account of 1920 registrations. From this amount had to be paid the cost of number plates, rebates, salaries of clerks, investigators and examiners, etc., in the automobile department. Eighty per cent of the balance of the money is by

law available for the maintenance and repair of State highways, and 20 per cent is available for the repair, improvement and construction of roads on through routes in towns, under the provisions of chapter 525 of the Acts of 1910. The Legislature in 1919 made available \$200,000 of the net motor vehicle fees for the maintenance and improvement of roads in the small towns of under \$3,000,000 valuation, under the provisions of chapter 155 of the General Acts of 1918. For further details relating to registrations, licenses, fees, etc., see Appendix A.

Automobile Hearings.

These hearings are held either upon complaints or as a result of investigations made by the Commission's investigators, or at the request of the operators whose licenses have been suspended or revoked. Such hearings have occupied the entire day on Wednesday of each week, and often other days in the week as well. During the past year the Commission held 611 public hearings, the number in 1918 being 595.

In addition to these the Commission receives every week a large number of reports of investigations made by its inspectors. These are read and acted upon. There were 2,058 such reports made in 1919, as against 2,001 in 1918. In 1919 the Commission's investigators prosecuted 531 operators in the courts.

During the year 16 operators or chauffeurs were placed on probation by the Board, and were required to report regularly for a certain period, at intervals of a month or so, to some particular officer. All of these persons reported regularly.

Examination of Garage Records.

During the year inspections were made at 159 garages to ascertain whether a proper record book was kept; and 2,800 individuals, corporations and companies were investigated to ascertain whether they were entitled to dealers' registrations. Approximately 300 of these were not approved. The investigators sent in 218 reports, the majority of these relating to illegal registration or misuse of dealers' plates. Since March, 1918, the Commission has issued no dealers' registrations until an examination has been made by one of its inspectors to determine whether the person applying was properly entitled to it.

Increase in the Work of the Investigating Department.

YEAR.	Examina-tions.	Reports by Investi-gators.	Hearings by Com-mission.	Lower Court Con-victions.
1908,	3,290	59	74	2,360
1909,	4,269	241	155	3,892
1910,	5,433	429	197	3,328
1911,	6,152	504	240	2,911
1912,	7,045	595	289	2,853
1913,	7,255	862	308	4,136
1914,	7,559	1,226	308	4,951
1915,	10,496	1,279	432	6,522
1916,	12,506	1,470	475	8,298
1917,	17,244	1,548	424	12,199
1918,	17,203	2,001	595	10,673
1919,	19,105	2,058	611	12,372
Totals,	117,557	12,272	4,108	74,495

Suspension and Revocation of Licenses.

The following summary shows the action taken by the Commission in the various cases in 1918 and 1919, and the causes of such action:—

Action taken on Formal Complaints after Hearing.

	1918.	1919.
Licenses revoked,	5	1
Licenses suspended,	29	28
Rights suspended,	2	2
Registration certificates suspended,	—	—
Dealers' registration certificates revoked,	1	—
Dealers' registration certificates suspended,	—	—
Complaints placed on file,	74	35
Complaints dismissed,	10	7
Operators cautioned,	8	8
Total hearings on formal complaints,	129	81

Suspensions and Revocations.

	1918.	1919.
Licenses revoked,	811	856
Licenses suspended,	957	1,013
Rights to operate in Massachusetts suspended,	393	264
Registration certificates suspended or revoked,	8	10
Registration certificates canceled,	7	2
Dealers' registration certificates suspended,	4	4
Dealers' registration certificates revoked,	16	-
Dealers' registration certificates canceled,	142	7
Total suspensions and revocations,	2,343	2,156
Suspensions and revocations resulting from court convictions, . .	1,083	1,047
Suspensions and revocations after hearings on formal complaints,	36	31
Suspensions and revocations after investigation, on which hearings were given in some cases.	1,224	1,078
Totals,	2,343	2,156

Causes of Suspensions and Revocations.

	1918.	1919.
Reckless operation,	239	339
Operating while under influence of intoxicating liquor,	553	554
Refusing or neglecting to stop after accident,	75	66
Accidents resulting in death,	471	506
Improper operation,	274	223
Three overspeeding convictions,	14	11
Operating auto without owners' permission,	178	137
Improper person,	170	186
Other offences,	369	134
Totals,	2,343	2,156

In 99 cases where persons were convicted of operating recklessly while under the influence of intoxicating liquor, and of other offences under the provisions of section 22, chapter 534 of the Acts of 1909, as amended by chapter 290 of the General Acts of 1916, the Commission adopted the recommendation of the courts that the licenses be not revoked.

Deaths.

In 1919 there were 547 fatal accidents in Massachusetts in which motor vehicles were involved, resulting in 591 deaths. There were 8 accidents in other States in which Massachusetts operators were involved, causing 9 deaths; 6 of these deaths were in Rhode Island, 2 in New Hampshire and 1 in Connecticut. These accidents were investigated because Massachusetts operators were involved, the total number of such persons being 573, the total number of fatal accidents investigated being 532.

The fatal accidents were disposed of as follows, the figures for 1918 being also given:—

	1918.	1919.
Licenses revoked,	123	158
Licenses suspended and reinstated after investigation and hearing,	249	223
Licenses suspended, final hearings pending,	37	80
Rights to operate in Massachusetts suspended, and, after investigation, serious fault found,	35	37
Rights to operate suspended, final disposition pending,	8	7
Rights to operate in Massachusetts suspended and reinstated,	17	17
No action because operator was unknown,	12	12
No action because of death of operator,	39	39
Totals,	520	573

Recommendations by Trial Justices.

Under the statute of 1916 the Commission is required to revoke the license of the operator whenever he is convicted of any of the more serious offences specified in the statute, unless the trial justice recommends otherwise.

This year the Commission adopted the recommendations of the judges that the license be not revoked in 99 cases; in 63 of these cases the conviction was for operating under the influence of liquor; in 24, for operating recklessly; in 8, for not stopping and making himself known after causing an injury; in 4, for operating an automobile without authority.

Examining and Investigating Department.

The plan of dividing the State into districts was continued, with the exception that the number was increased from 15 to 16 districts, these districts being grouped into 7 divisions. An inspector was assigned to each district, with experienced men having the title of division inspectors assigned to divisions, their work to consist of investigation of accidents and complaints of a more or less difficult nature; also having supervisory authority over the district inspectors. This plan was only partially adopted owing to the insufficient number of men. In the sections of the State where it was adopted successful results were obtained. Men with but slight experience soon became proficient under the direct supervision of experienced division inspectors.

The personnel of the department now consists of 1 chief inspector, 25 inspectors, 9 stenographers and 2 clerks, a total of 37.

The work of this department, since the Commission was authorized by the Legislature to employ investigators, is well shown by the following table:—

YEAR.	Autos registered. ¹	Motor-cycles registered.	Number of Persons killed.	Number of Persons injured.	Licenses suspended.	Licenses revoked.	Rights suspended.
1908,	18,066	1,922	13 ²	486 ²	51	44	—
1909,	23,971	2,394	54	989	132	68	—
1910,	31,360	3,358	77	963	198	90	—
1911,	38,907	3,658	110	1,248	254	95	—
1912,	50,132	5,034	142	1,962	325	190	—
1913,	62,660	7,127	188	2,923	365	198	—
1914,	77,246	8,161	229	4,010	521	231	34
1915,	102,663	9,520	294	6,197	615	303	181
1916,	136,809	10,713	315	9,131	641	514	232
1917,	174,274	11,065	438	7,282	794	717	300
1918,	193,497	12,862	499	8,598	957	811	398
1919,	247,182	13,698	582	16,281	1,013	856	264

¹ Includes trucks and commercial vehicles.

² From July, 1908, to Dec. 1, 1908.

During this eleven and one-half years 10,478 cases have been investigated. This year reports were made covering investigations in 2,058 of these cases.

The number of motor vehicles registered, including motorcycles, increased from 206,359 in 1918 to 260,880 in 1919, an increase of 54,521, or 26 per cent.

The number of people killed increased from 499 in 1918 to 582 in 1919. More than half of the persons killed were pedestrians, as is true every year; the number increased from 304 in 1918 to 379 in 1919. The number of pedestrians injured by motor vehicles has increased from 3,871 in 1918 to 5,719 in 1919.

The total number of people injured in 1918 was 8,598; in 1919 it was 16,281, an increase of 7,683 in the number of people injured. This was accounted for by the increase in the number of occupants of automobiles who were injured, the number of such occupants injured in 1918 being 3,560, and in 1919, 8,712, or 5,152 more in 1919 than in 1918, and an increase of 1,848 in the number of pedestrians injured.

Accidents in which Motor Vehicles were involved.

The report of our investigating department, which will be found in the Appendix, shows that there were 15,888 recorded in 1918, and 21,304 in 1919.

As usual there were many more accidents in the daytime than at night; 17,366 accidents occurred in the daytime, and 3,938 at night, 18,871 of these accidents occurring on city streets, and only 2,433 on country roads.

Headlights on Motor Vehicles.

A crusade against violators of the dazzling light regulation was started the week of May 19, continuing until the latter part of July. This work was carried on throughout the State. As a result of the activity of our inspectors in this work, the police in numerous cities and towns detailed men to enforce the regulation. This applied especially to the city of Boston, where the police department did excellent work.

Complaints were brought before the courts against operators who had made no attempt to comply with the regulation.

There were 342 persons prosecuted in the courts for operating with dazzling lights, fines being imposed amounting to \$2,321. Our inspectors filed 444 reports concerning lights.

Second-hand Motor Vehicles,—Sales, Records, Legislation.

The Legislature in 1919 passed a statute, chapter 259, being "An Act to regulate the purchase and sale of second-hand motor vehicles and parts thereof," containing in substance the recommendations made by the Commission.

Second-hand Motor Vehicle Division.

This was made a subdivision of the examining and investigating department under the above-mentioned statute, which only went into effect on Sept. 26, 1919.

Forms approved by the Commission were printed and distributed to the licensing authorities of the various cities and towns.

In complying with the act it is planned to keep a card record of all motor vehicles registered in the Commonwealth, filed under the engine number, the card showing a continuity of ownership. It is expected that during the coming year approximately 200,000 of these cards will have been written and filed.

The daily and weekly reports of motor vehicles purchased or sold by licensed dealers or others, after being recorded on the above-mentioned cards, are placed on file for ready reference.

A special record is also kept of all motor vehicles reported to the Commission as having been stolen.

Notifications have been received from 109 cities and towns reporting that they have issued 813 licenses to dealers in second-hand motor vehicles.

The work of this department has only just begun, but it is believed that if similar legislation were enacted in the adjoining States it would to a great extent diminish the number of cars that are stolen, and it certainly would make the disposal of such cars more difficult.

AIRCRAFT.

In 1913 the Legislature, by chapter 663, made it unlawful to operate an aeroplane or any aircraft of any kind unless licensed by the Highway Commission, except with a licensed pilot, and then not for a distance exceeding 500 miles.

The act also provided that no license shall be issued until a satisfactory examination has been passed, a flight being required to be made under the direction of an expert employed by the Commission; also no person was to receive a license unless he could prove that he had flown not less than 100 miles in some standard type of machine. No aeroplane could be used until it had been inspected, approved and registered by the Commission, and there were requirements as to the size and method of displaying registration numbers; also certain rules were laid down as to machines meeting, overtaking, meeting at an angle, etc., with certain provisions as to the altitude at which machines should be operated under various circumstances, as to landing, and prohibiting flying over buildings unless at a sufficient altitude, etc.

These provisions, however, did not apply to military aviators while in the service of the Commonwealth or the United States. Only two or three people were licensed under this act. In 1919 the Legislature changed this law very materially, recognizing the licensing and registering of operators and machines by the Joint Army and Navy Board on Aeronautic Cognizance, or any Federal board or department established by Congress.

The Commission was authorized to issue licenses without examination to any person who was commissioned as an aviator in the United States Army or Navy or Naval Reserve Corps.

This law also contained provisions as to what should or should not be done by operators of aircraft, and authorized the Commission or any public officials who were in charge of any land owned or controlled by the Commonwealth, or by any city or town, or by the Metropolitan Park Commission, to designate and set apart landing places, and make reasonable rules and regulations governing their use.

It also authorized the Commission to prepare rules and regulations from time to time relative to the use and opera-

tion of aircraft, and relative to the licensing of the operators thereof.

Only five machines have been registered and six people licensed up to the present time.

EARLY DEMAND FOR IMPROVED HIGHWAYS.

The agitation and demand for improved highways in Massachusetts started several years before anything practical was done by the Legislature.

So many people have claimed to be the originators of this movement and of the first act that was passed that it is impossible to name them all or to determine who was entitled to the most credit.

One of the earliest advocates of highway improvement and co-operation on the part of the State was the Hon. Elihu B. Hayes, often known as the father of the Australian Ballot Act, who was a member of the Legislature for several years, and afterward mayor of Lynn. He introduced resolves into the Legislature, and advocated the passage of various bills and resolves as early as 1887, 1888, 1889 and 1890.

About this time the bicycle clubs and associations became well organized in the State, under the leadership of Mr. Albert Pope and Mr. George S. Perkins, who advocated the passage of legislation which would tend to secure improved highways, Mr. Perkins being appointed on the first commission.

Preliminary Commission appointed in 1892.

This agitation resulted in the passage of an act, chapter 338 of the Acts of 1892, entitled "An Act to establish a commission to improve the highways of this Commonwealth."

This act required the appointment, by the Governor, of three persons, one of whom should be a civil engineer, who were instructed to consider the best and most practical method for the construction and maintenance of highways, the estimated cost of various methods and systems, the establishment of State or county highways, and recommendations as to their construction and maintenance, routes, approximate cost, and also the geological formation of the State so far as it related to materials suitable and proper for road building.

The offices of the members of this commission were to expire on the first Wednesday of February, 1893. The commission was ordered to report fully, with plans and estimates in their recommendations, to the Legislature on or before the first Wednesday of February, 1893.

Gov. William E. Russell appointed on this temporary commission Mr: George S. Perkins of Cambridge; William E. McClintock of Chelsea; and Prof. Nathaniel S. Shaler of Cambridge.

Their report was made, and would to-day serve as a model for the States which are now at last undertaking the improvement of their highways, and which are going to spend large sums in connection with the Federal government in constructing modern highways.

The report contains a most interesting and exhaustive account of the topography of Massachusetts with relation to the materials available in the various parts of the State for road building; the soil and subsoil conditions which would make road building difficult and would require special methods of treatment in various parts of the State; a very complete report on road materials available in the State, and the values of each from the point of view of both construction and maintenance and their ability to stand traffic; and a more or less complete survey of the conditions of the Massachusetts roads.

Poorer Towns must be assisted to build Highways.

This survey showed that there were 214 towns in the Commonwealth where the average amount of money expended for roads varied from an average of \$16.20 a mile in 73 towns to \$38.20 a mile in 56 towns, and the commission stated that it was impossible for those towns to either build or maintain any important through roads with their own funds and without outside aid.

Highways in Very Bad Condition.

The report showed that the roads throughout the Commonwealth, outside of city and town streets, were in a deplorable condition, and could not be improved unless either the counties or the State provided a large part of the necessary funds.

It made quite an exhaustive study of the economics of road

construction and improvement, which showed conclusively not only that the building of good roads would pay, but that the saving in the cost of transportation would amount to a large sum of money every year.

Traffic Census, 1892.

The commission also made an actual traffic count on some of the main roads leading into Boston, showing the amount and weight of traffic at that time, and the saving that could be effected if the roads were improved, with a comprehensive treatise on the methods of construction of city streets and various materials, including stone block, wood block, asphalt and the comparative cost of transporting heavy loads over the same.

Power required to pull One Ton on Different Road Surfaces.

It also started the measuring of grades, and showed the amount of pull which was necessary to pull one ton on the various characters of surfaces. This is a subject which is now occupying the attention of the road builders and societies for municipal improvement and their engineers throughout the country. It might be interesting for them to know that back in 1893 the Massachusetts Highway Commission had determined by experiment that on a smooth-paved surface of ordinary character it required a pull of 33.4 pounds to start a load weighing 1 ton; that on a first-class macadamized road it required a pull of 44 pounds; on a thin macadam road, with a foundation of somewhat springy nature, a pull of 62 pounds; while on a gravel road of good character a pull of 140 pounds was required to start such a load. In other words, one horse could pull over four times the load on a smooth-paved surface that it could over a gravel road.

It is only recently that these tests have been developed, and substantially the same results have been arrived at throughout the country; in fact, the tests with motor vehicles are showing practically the same saving in power upon improved road surfaces that the Massachusetts Highway Commission found by actual experience twenty-six years ago.

Foundation and Drainage Essential.

This preliminary report would be a model that could well be followed by the road builders in every State, especially in relation to matters of foundation and drainage, as it was shown conclusively how important it was to have a road constructed (no matter what its surface was) upon a suitable, strong, dry and adequate foundation; that a road could not be successfully built upon clay or loam or any fibrous or other soil that would either hold water or would remain wet by capillary attraction; that the subsoil foundation must be drained, and they gave plans for the drainage, showing both blind side drains with pipes to cut off the water and suitable outlets to discharge, and drains in the middle of the road where necessary, at that time under a Telford foundation; and they particularly emphasized the necessity of keeping the foundations dry and of making the top waterproof.

**TESTING ROAD MATERIALS, METHODS, RESULTS, ETC., SINCE
1894.**

In 1894 a study of the road materials available in the various parts of the State was made, and the result plotted on some topographical sheets. This work was done by Logan Waller Page, who afterward became director in the Bureau of Public Roads of the Department of Agriculture, Washington, where he continued his research work and scientific testing of materials until his death, in December, 1918.

Mr. Page made elaborate tests of the various road materials. Testing machines were devised and are shown in the report.

These tests or similar ones have been continued down to the present day, the tests of the various rocks being made by the Bureau of Public Roads in Washington, and the tests of cements, bitumens, etc., by chemists employed by the Commission. Full information will be found in the annual reports.

THE MACADAM ROAD.

In its very first years the Massachusetts Highway Commission drew specifications for the construction of a waterbound macadam road by a method which, so far as can be ascertained,

they inaugurated; to wit, using the whole run of the crusher with the least possible waste, the rolling of the stone by a heavy roller, preferably a steam roller, the stone to be put on in three courses, the bottom course to consist of what was called No. 1 stone, $3\frac{1}{2}$ to $2\frac{1}{2}$ inch stone, spread about 4 inches thick and rolled to about 3 inches; the second course of the smaller stone, $2\frac{1}{2}$ to $1\frac{1}{4}$ inches, which was also to be rolled, and then the top course of still smaller stone, chips and dust, which was to be evenly spread and flushed while it was being rolled, until the road was made with as few voids and as waterproof as possible.

Their specifications for rolling at that time required the compacting of the stone by the roller until a single piece of broken stone put upon the top of the rolled surface would be crushed by the roller without being compressed into the road.

Their very early specifications and reports show a very careful and analytical study of the amount of voids in ordinary broken stone, showing that before it was rolled the voids were nearly 40 per cent, but that by thorough rolling and using the graded sizes of stone they could be reduced to only 15 or 20 per cent.

MATERIALS MUST BE EVENLY SPREAD.

They also showed the necessity for, and insisted upon the spreading of, all materials either from a dumping board or on the side, and explained clearly the bad results that would necessarily come if the material, either stone or gravel, were dumped instead of being evenly spread, because if dumped, too much material would be in one place, and would produce mounds, and too little in another place would produce depressions, resulting in the road rapidly deteriorating and the formation of mud puddles, etc.

MILLIONS SAVED BY ADEQUATE FOUNDATIONS AND DRAINAGE.

The conclusions which they then arrived at, and the plans which they then made and advocated, both as to drainage, foundation and construction, and methods of using material, have been followed by all their successors ever since.

ROAD MILEAGE IN THE COMMONWEALTH.

In this first report the road statistics for the whole State are given, showing that there were about 18,000 miles of road in the towns outside of the city streets; the appropriations of all the various towns for highway purposes, etc., are also given. (Appendix, 1893 Report.)

ORGANIZATION OF THE MASSACHUSETTS HIGHWAY COMMISSION.

Since the organization of the Massachusetts Highway Commission the roads constructed by it have been built to conform to standard plans and approved methods of construction.

The preliminary commission appointed by Governor Russell in 1892 consisted of Mr. George S. Perkins, who was a "good roads advocate," and who represented the bicycle clubs and riders of the State; Mr. William E. McClintock, who had been city engineer for the city of Chelsea, who was an engineer by profession, and as a private engineer had been building highways in various cities and towns in the Commonwealth; and Prof. Nathaniel S. Shaler, who was Dean of the Lawrence Scientific School, Harvard College, and a world-famous scientist and naturalist, who had written many recognized textbooks on subjects pertaining to geology and materials suitable for road building, and who had been connected with various governmental topographical and geological surveys.

Massachusetts Highway Commission established in 1893.

This preliminary commission reported, recommending the passage of an act to establish a Highway Commission. This act was passed by the Legislature in substantially the form in which it was recommended, as chapter 476 of the Acts of 1893. The same three gentlemen were appointed as the first members of the Massachusetts Highway Commission. The law has been added to, changed and modified somewhat from time to time, but much of its original language will be found not only in the laws of this State, but many other States to-day.

The Commissioners were appointed for terms of one, two and three years, respectively, but reappointments were to be made

for a term of three years, thus insuring continuity in office and continuity in policies as to the standard construction, etc.

The Commission was to appoint its engineer, secretary, accountants, etc., although some of them had to be selected from the civil service list.

The personnel of the new Commission was the same as of the special commission appointed in 1892,—George S. Perkins, Nathaniel S. Shaler, William E. McClintock. Mr. Perkins was elected chairman. In 1896 he retired from the Board, and Governor Greenhalge appointed Thomas C. Mendenhall of Worcester. He was also elected chairman. Professor Shaler retired in 1898, and Governor Wolcott named Charles W. Ross of Newton in his place. Dr. Mendenhall remained as chairman until 1900, when both he and Mr. Ross retired. Governor Crane thereupon appointed Harold Parker of Lancaster and John H. Manning of Pittsfield. Mr. McClintock was elected chairman.

The Commission as then organized served until July, 1908, when Mr. McClintock resigned, and Acting Governor Draper appointed William D. Sohier of Beverly. Mr. Parker was designated as chairman. In June, 1909, Mr. Manning died, and Governor Draper appointed Frank D. Kemp of Springfield to succeed him. Mr. Parker resigned in 1911.

In 1912 Governor Foss named James W. Synan to fill the vacancy caused by Mr. Parker's resignation, and designated Colonel Sohier as chairman. From the time Mr. Synan qualified until Dec. 1, 1919, when the Highway Commission was merged with the Waterways Commission into the Department of Public Works, the personnel of the Board remained unchanged.

From the organization of the Commission in 1893 until the end of its activities in 1919 there were but ten Commissioners. The first chairman, Mr. Perkins, was prominent in the affairs of the League of American Wheelmen. Professor Shaler was Dean of the Lawrence Scientific School at Harvard. Mr. McClintock was an engineer of prominence. Dr. Mendenhall was president of the Worcester Polytechnic Institute. Mr. Ross was a practical road builder of long experience. Mr. Parker was an engineer of marked ability. Mr. Manning was a merchant of Pittsfield, and long identified with county affairs. Colonel Sohier, a lawyer by profession, had for many years prior to his

appointment to the Commission been a student of road building, and had done a great deal of practical work along that line. Mr. Kemp was a business man. Mr. Synan had for many years been tax collector for the city of Pittsfield.

The Chief Engineers.

The first chief engineer appointed by the Commission was Mr. Charles S. Mills. He served with the Commission for eight years, and was very largely responsible for some of the standard plans and specifications that were adopted.

When he resigned, Mr. Austin B. Fletcher, who was a graduate of the Lawrence Scientific School at Harvard, and who had been appointed as the first secretary of the Board, served not only as secretary and executive officer of the Board, but also as chief engineer. The reports of the field forces and division engineers were made to the secretary, who transmitted the directions of the Board to the division engineers and field forces, as well as to the office forces who made the preliminary surveys, specifications, etc.

Mr. Fletcher served as secretary and chief engineer until 1910, when he accepted a position with the county of San Diego, California. When Mr. Fletcher resigned, in 1910, Mr. Arthur W. Dean, who had been State Engineer for the State of New Hampshire, was appointed by the Board as the chief engineer, and he has remained in that position up to the present time.

The Secretaries of the Commission.

The first secretary of the Commission was Mr. Austin B. Fletcher, mentioned heretofore.

When the Legislature put the supervision of the telephone and telegraph companies under the Highway Commission, Mr. F. I. Bieler, who had been traveling auditor for the firm of Stone & Webster of Boston, was appointed assistant secretary, particularly to take care of the reports of the telephone and telegraph companies. After Mr. Fletcher resigned Mr. Bieler was appointed secretary, in which position he has remained.

Mr. Fred Fair was made assistant secretary when Mr. Bieler became secretary, and is still in that position. Mr. Fair came to the Commission in 1900.

Office Force.

Mr. John M. McCarthy was appointed stenographer and to take charge of the accounts of the Commission in July, 1894. He still has charge of the accounting work.

Miss Mary A. Riley was appointed official stenographer of the Board in 1896, and served as the recording secretary. She has been with the Commission to the present time.

Organization.

The first organization was naturally preliminary merely, but practically consisted of a chief engineer and other engineers who acted as chiefs of party, surveys, etc., and an office force who plotted the surveys, made specifications, etc.

The methods adopted very early in the year 1895 have been practically continued up to the present time; to wit, the office force is in charge of an assistant chief engineer who has had charge of directing survey parties, the plotting of plans, making cross sections, the establishment of grades, etc., and the drawing of specifications for the work.

The State was divided into divisions at an early date, each one being in charge of a division engineer acting under the direction of the chief engineer.

The organization to-day is very similar, although the divisions have been very materially changed as the work progressed.

There are to-day four divisions. A number of the engineers have served with the Commission for a great many years, some of them practically from the beginning. Mr. W. R. Farrington, who is now division engineer in the Cape District, entered the employ of the Commission in 1894. Mr. J. A. Johnston, who is now division engineer in the Springfield District, entered the employ of the Commission in 1895. Mr. Franklin C. Pillsbury was one of the first division engineers, appointed in 1895, and he is now division engineer in the Metropolitan District. Mr. Charles H. Howes entered the employ of the Commission in 1901, was made a division engineer in the Greenfield District in 1906, and has been there ever since.

Mr. Hiram D. Phillips has served with the Commission since 1897, acting as engineer in various capacities until he became assistant division engineer. For the last eight years he has been in charge of work done under various special acts of the Legislature, the Mohawk Trail from Charlemont to the top of the Mountain at the North Adams line, special work under chapter 221 of the Acts of 1915 in the western counties, and he is now in charge of much of the work done under chapter 155 of the Acts of 1918.

ENGINEERS WHO WORKED FOR THE COMMISSION AND WENT ELSEWHERE.

A very large number of distinguished engineers who have made their mark in highway building served their first apprenticeship with and secured their knowledge from the Massachusetts Highway Commission. They left to secure better positions at much higher salaries, among them the following:—

It is impossible to name them all, because our records are not complete, but the few that we do know about will serve to show what an influence the Commonwealth of Massachusetts has had in the road building throughout the United States.

Mr. Austin B. Fletcher, the first secretary and afterward chief engineer, as mentioned above, went to the county of San Diego, California, as county engineer.

Mr. F. H. Joyner, who was division engineer in the Berkshire District, became county engineer for the county of Los Angeles, California.

Mr. W. W. Crosby, who went from this Commission to take a position as engineer for the city of Baltimore, afterward became State Engineer for the State of Maryland.

Mr. A. N. Johnson, who served with the Commission in 1897, was afterward State Engineer for the State of Maryland for seven years, then State Engineer for the State of Illinois for eight years.

Mr. Logan Waller Page, who had charge of the survey of road materials all over the State, in 1905 became the director in the Office of Public Roads, Department of Agriculture, Washington.

Mr. Charles M. Upham, who is now State Engineer for the State of Delaware, and Mr. Ralph C. Heath, who became assistant State Engineer for the State of Kentucky, both served with the Commission for many years.

Mr. Herbert C. Poore served with this Commission from 1906 to 1908. He was employed to make special investigation and study of bituminous materials and their use in highway construction. He left to go with a private concern.

Mr. W. P. Hammersley, who was for many years assistant division engineer in the Cape District, until he became engineer for the city of New Bedford, and afterward town manager for the town of Norwood, served with the Commission from June, 1893, to April, 1915.

Mr. Edward F. Ruggles was for six years resident engineer with this Commission. He then became assistant engineer for the State of Maryland, where he served for twelve years. He is now senior highway engineer for the Bureau of Public Roads at Washington, supervising the Federal-aid work in Massachusetts and Rhode Island.

Mr. Harold P. Starbird was with this Commission from 1896 to 1908, when he became a first assistant engineer for the New York State Highway Department, which was at that time organized. He has served there ever since.

Mr. David H. Winslow served with this Commission from 1895 to 1908. From 1908 to 1917 he served with the Bureau of Public Roads at Washington as superintendent of construction. Since 1917 he has been a State Engineer for the State of North Carolina, in charge of maintenance.

Mr. W. A. Grover served with this Commission for three years, commencing in 1906. Since then he has served with the State of New Hampshire in various capacities. He is at present representing that State on the Interstate Bridge Commission.

Mr. M. W. Fisher served one year each with the Metropolitan Park Commission, the Commission on Harbors and Public Lands, and the Metropolitan Water and Sewerage Board. He served with this Commission from 1905 to 1914.

These men have spread the gospel of good roads not only in

this country but elsewhere, and have carried with them the standards of making surveys, cross sections, adequate foundation and drainage that have not only been preached but practiced for so many years in the State of Massachusetts.

The reputation which Massachusetts has maintained for all these years as a leader in highway construction and maintenance is due largely to the loyal, skillful, efficient and tireless service of these employees.

REPORTS TO THE LEGISLATURE.

Studies, Statistics and Reports on Highways and Materials.

From the very beginning the Highway Commission has been consulted by, and been required to make reports to, the Legislature from time to time.

These reports covered a great variety of subjects, including practically everything that the Commission had anything to do with during the twenty-seven years of its existence:—

Highways — costs, materials, road statistics and highway appropriations in all the cities and towns in the Commonwealth.

Motor vehicles — regulation, fees, disposition of fees, laws, damages, jitneys, indemnity insurance, inspection, investigation of accidents, etc.

Telephones — valuation of plant, rates in the metropolitan district, in various counties, etc.

One of the Commission's duties from the very start has been to submit an annual report to the Legislature as to expenditures, etc., "together with such statements, facts and explanations bearing upon the construction and maintenance, of public roads, and such suggestions and recommendations as to the general policy of the Commonwealth in respect to the same, as seem to them appropriate." This requirement is still in force.

The Commission has nearly every year made suggestions and recommendations, almost all of which have been enacted into law. In fact, the report of the preliminary commission in 1893 was a most comprehensive report as to the conditions in Massachusetts, topographical, geological, materials and statis-

ties, as to highways and conditions in all the cities and towns in the Commonwealth.

These reports were of the utmost value at the time, and many of them are of great value to-day, not only as showing the condition as to highways in years gone by, but very many of them are useful to-day to prevent duplication of work, such as the earlier tests made on various rocks, gravel, sands and material found in various parts of the State, practices abroad, etc., and the later tests, experiments and actual results obtained with various bituminous and other materials used in various ways in actual highway construction.

These studies in connection with the traffic census showing what traffic these roads have actually carried, and an inspection of the road itself and its present condition, will furnish most valuable, accurate and practical information as to road builders in the future. The actual costs of each item have been kept from the beginning of the work.

Too much space would be required if even the titles of all these reports were printed, but a few of the most important of them made to the Legislature are included in this report so that they can be found and referred to easily in the future.

1906. Studies and surveys to be made of the Newburyport Turnpike cost, and to report on same (chapter 93, Acts of 1906). Report contained in 1907 report of the Commission, page 19, etc.

Estimated cost for 9.93 miles, Saugus Branch Railroad to Andover Street, Danvers, \$72,509; estimated cost for 17.73 miles, Andover Street, Danvers, to Newburyport, \$257,429; total estimated cost, 27.66 miles macadam road, \$369,928.

1907. Advisability of laying out and constructing as a State highway Washington Street in the West Roxbury district of the city of Boston, between the entrance to the Stonybrook Reservation and the Dedham line, under the provisions of chapter 52 of the Resolves of 1906. This report was printed in 1907 as House Document No. 122.

1909. Relative to the construction and maintenance of Parker River bridge in the town of Newbury, under the provisions of chapter 531 of the Acts of 1906. This report was printed in 1909 as House Document No. 1400.

1910. Advisability of constructing a State highway on Washington Street in the West Roxbury district of the city of Boston from Lagrange Street to Metropolitan Avenue, under the provisions of chapter 108 of the Resolves of 1909. This report was printed in 1910 as House Document No. 145.
1910. Investigation and study of causeways and bridges under the provisions of chapter 136 of the Resolves of 1909. This report was printed in 1910 as House Document No. 1795.
1912. Senate order dated Jan. 17, 1914, requesting the Commission to report as to whether the public interest requires, and whether the revenues of the New England Telephone and Telegraph Company would permit, that the cost of service in the Metropolitan District in any or all of five specified classes of service be reduced. The Commission made a report to the Senate on Feb. 14, 1912, this report being printed in its annual report of that year, pages 207, etc., and is also printed as Senate Document, No. 338.
1912. Rates and service in Barnstable County by the Southern Massachusetts Telephone Company, under the provisions of chapter 67 of the Resolves of 1912.
1913. Widening of Humphrey Street in the town of Swampscott, under the provisions of chapter 135 of the Resolves of 1912. This report was printed in 1913 as House Document No. 155.
1913. Cost of abolishing grade crossings, under the provisions of chapter 125 of the Resolves of 1912. This report was made jointly by the Boards of Highway Commissioners and Railroad Commissioners, and was printed in 1913 as House Document No. 1878.
1914. Construction of State highway on North Beacon Street in Boston and Watertown, under the provisions of chapter 57 of the Resolves of 1913. This report was printed in 1914 as House Document No. 1569.
1914. Construction of traffic road in Revere from Revere Street to Elliot Circle, under the provisions of chapter 697 of the Acts of 1912. This report was printed in 1914 as House Document No. 1405.
1915. Report on the construction of a new highway bridge with suitable approaches across Cohasset Narrows, so called, at the dividing line between Bourne and Wareham, under the provisions of chapter 88 of the Resolves of 1914. This report was made jointly by the Highway Commission, the Barnstable county commissioners and the Plymouth county commissioners, and was printed in 1915 as House Document No. 278.

1916. Widening of highway from Boston to Worcester and use of Prison Labor, under the provisions of chapter 60 of the Resolves of 1915. This report was printed in 1916 as House Document No. 366.
1916. Maintenance of safe surfaces for horses and horse-drawn vehicles, under the provisions of chapter 79 of the Resolves of 1915. This report was printed in 1916 as House Document No. 7755.
1916. Construction of Ocean Avenue in Revere, under the provisions of Chapter 64 of the Acts of 1915. This report was made jointly by the Boards of Highway and Metropolitan Park Commissioners, and was printed in 1916 as House Document No. 1607.
1916. Revision and codification of laws relating to highways and bridges, under the provisions of chapter 95 of the Resolves of 1915. This report was printed in 1916 as House Document No. 8.
1916. Construction of a highway in the town of Hingham, under the provisions of chapter 91 of the Resolves of 1915. This report was printed in 1916 as House Document No. 367.
1916. Extension of State highway along the northerly bank of the Merrimac River in Lowell and Dracut, under the provisions of chapter 77 of the Resolves of 1915. This report was printed in 1916 as House Document No. 7.
1916. Necessity and desirability of regulating the use and character of lights on motor vehicles under the provisions of chapter 17 of the Resolves of 1915. This report was printed in 1916 as House Document No. 365.
1917. Construction and reconstruction of sections of State highway for experimental purposes for the use of horses and horse-drawn vehicles and motor vehicles, under the provisions of chapter 133 of the Resolves of 1916. This report was printed in 1917 as House Document No. 460.
1917. Revision and codification of laws relating to highways and bridges, under the provisions of chapter 95 of the Resolves of 1915. This report was made by a special commission of which the Highway Commissioners were members, and was printed in 1917 as House Document No. 1653.
1917. Construction of a State highway in Somerville, under the provisions of chapter 109 of the Resolves of 1916. This report was made jointly by the Boards of Highway and Metropolitan Park Commissioners, and was printed in 1917 as House Document No. 153.

1918. The construction of a State highway, connecting Boston and Brockton, via Granite Avenue in Milton, Willard Street in Quincy, thence through Braintree, through Holbrook to Brockton, under the provisions of chapter 120 of the Resolves of 1917. This report was printed in 1918 as House Document No. 13.
1918. Investigation relative to the protection of persons and property from injury by motor vehicles under the provisions of chapter 47 of the Resolves of 1917. This report was printed in 1918 as House Document No. 9.
1918. Construction of a road along the shore of Salem Harbor in Salem and Marblehead, under the provisions of chapter 112 of the Resolves of 1917. This report was printed in 1918 as House Document No. 12.
1919. Construction of the Pilgrim Highway, so called, from Atlantic, in the city of Quincy, to the Fore River bridge, under an order of the House of Representatives, issued in 1919. This report was made jointly by the Boards of Highway and Metropolitan Park Commissioners, and was printed in 1919 as House Document No. 1840.
1919. Investigation relative to the amount and disposition of motor vehicle fees and related matters, under the provisions of chapter 72 of the Resolves of 1918. This report was made jointly by the Highway Commission, Supervisor of Administration and Secretary of the Commonwealth, and was printed in 1919 as House Document No. 1450.
1919. Investigation, survey and report as to the advisability and estimated cost of constructing a State highway in Williamstown westerly over Petersburg Mountain to the New York State line, under the provisions of chapter 254 of the Resolves of 1919. Report filed Jan. 7, 1920. About 6 miles to be built; estimated cost, about \$400,000.

SUPERVISION OF TELEPHONE AND TELEGRAPH COMPANIES.

By chapter 433 of the Acts of 1906 the Massachusetts Highway Commission was given general supervision of all companies in this State engaged in the transmission of intelligence by electricity.

The companies were to make annual returns to the Com-

mission, give it full access to their books, and keep their books and accounts in such form and shape as might be approved by the Commission.

The act further provided that upon a complaint in writing by the mayor and aldermen of a city, the selectmen of a town, or twenty of the companies' subscribers, the Commission should hold a public hearing and should make recommendations to the company as to any reductions, modifications or continuance of the rate or service complained about.

The Commission was to include in its report to the Legislature the recommendation made to the company and the company's action thereon, with any suggestions which it saw fit to make.

Complaints as to Rates — Public Hearings.

In 1907 quite a few complaints were made by different organizations and interests, and some fifteen hearings were held, in which it was claimed that the New England Telephone and Telegraph Company's rates were unfair, discriminatory and unequal, not only as between different places and exchanges, but between individuals obtaining substantially the same service.

It was also claimed that the company could afford to make a very large reduction in rates because the capital was greatly inflated, and largely in excess of the value of the plant, etc.

The Commission at that time engaged the firm of Stone & Webster to make an examination of the companies' accounts, etc.

There was also a committee, consisting of Mr. George Albree, who represented some of the petitioners; Mr. Longley, representing the company; and Mr. Patterson of Stone & Webster, the expert employed by the Commission, to examine into and report on certain matters.

Recommended Discontinuance of Certain Improper Practices.

The Commission at this time found that the companies had certain practices which it believed were discriminatory and should not be continued.

It therefore recommended to the company that it discontinue the issuing of frank toll books except to employees engaged on company's business, and the discontinuance of free telephones except to employees and charitable institutions and such as were needed in the company's own business.

It also commented on the subscriptions that had been made by the company for certain charitable institutions and certain campaign purposes. Such subscriptions were prohibited by a statute passed in 1907.

The report was made by the committee consisting of Messrs. Albree, Longley and Patterson in December, 1907, — too late to be put into the annual report.

Rates shown to be Discriminatory and Unequal.

This showed that many of the rates were very discriminatory and unequal, and raised many questions as to the value of the company's property that was actually in use and required for the public as compared with the amount of stock and bonds outstanding.

The Commission then engaged Mr. Dugald C. Jackson in January, 1908, a professor at the Massachusetts Institute of Technology and who had acted as an expert on telephone rates in the city of Chicago, to make a study of the situation in relation to the telephone company here.

Appraisal and Valuation of Property recommended.

It also recommended that an appraisal of the actual plant used, including all the plant, all poles, crossbars, wires, exchange switchboards, instruments, real estate, etc., be made; that this inventory should be made as accurately as possible in the field, and then tabulated, and a valuation made thereof of its fair replacement value.

It meantime asked Professor Jackson whether, pending such an inventory and study of rates, it would not be possible to reduce toll rates between the central exchanges in Boston and the suburban districts.

Reduction in Local Toll Rate recommended.

On March 28 the Commission recommended to the company that the toll rates between the 8 central exchanges and 16 suburban exchanges that were situated within 5 miles, should be reduced from 10 to 5 cents. This the company agreed to do, to take effect on April 15.

The Commission then sent a letter to Acting Governor Eben S. Draper, recommending that in order that it might get necessary knowledge to enable it to make a businesslike, fair and equitable recommendation in regard to rates, it should be authorized by the Legislature, and sufficient money should be appropriated to enable it to make an actual appraisal of the property of the company used in the State of Massachusetts, and have a fair valuation put thereon of its replacement value.

Appraisal and Valuation authorized.

The Governor sent a special message to the Legislature, and the Commission was authorized by a resolve, chapter 102, approved May 26, to make such an investigation, appraisal and valuation of the property of the company, and \$30,000 was appropriated for that purpose, the money to be paid in the first instance from the State treasury, and subsequently repaid to the Commonwealth by the company.

The Commission employed Prof. D. C. Jackson, who was connected with his brother, William B. Jackson, as experts, and also Mr. A. R. Patterson as expert accountant. The book value of the company's physical property at that time, in 1908, was something over \$30,500,000.

A field force and a force of engineers and typewriters were immediately engaged, and an actual count was made of the poles, crossbars, wires, switchboards, instruments, etc., real estate, buildings, underground conduits, etc. The company and all its officials co-operated and did everything that they could to facilitate the work and to insure its accuracy throughout all the investigations that were made. These were actually counted on the ground in each city and town in the Commonwealth, and the results were carefully tabulated. This

tabulation was made under the charge of Mr. Hammond S. Hayes.

At the suggestion of the company this inventory and appraisal were made to include all the property of the company in the other States in which it operated; to wit, Maine, New Hampshire and Vermont.

After this inventory had properly been made and the real estate was actually valued by real estate experts, prices were secured for the replacement of all instruments, switchboards, wires, conduits, poles, crossbars, and equipment of every description, and each item was then valued.

Further Study of Rates recommended.

This inventory and appraisal were made in March, 1909, and were forwarded to Governor Draper.

The Commission at that time recommended that a further sum of money be appropriated, and that it should be authorized to continue this study in order to ascertain the cost of doing service, the amount and value of plant to be used in each class of this service and in the various localities, and to divide it between what was local plant and the plant that was used for toll purposes.

Governor Draper sent a special message to the Legislature, and \$35,000 was appropriated to enable the Commission to continue its investigation (chapter 78 of the Resolves of 1909).

This study was immediately started upon in order to determine as nearly as possible what would be fair and equitable rates.

The valuation of the physical property situated within the Commonwealth was something over \$34,000,000; that located in the other three States was over \$12,400,000, or a total replacement value of the property of the company of \$46,819,000.

The total amount of the company's stocks and bonds outstanding was \$38,939,850, or considerably less than the replacement value of the property.

The valuation was made so as to show the value of the property in the metropolitan and suburban districts, in cities of over 50,000 inhabitants, and in other parts of the country,

as well as the valuation of the property and plant that was used for toll purposes which was found to constitute 42 per cent in value of all the property and plant of the company.

The traffic study of the business done by the Bell Telephone companies in the United States showed that the connections made in a year were over 5,800,000,000; that the net earnings from connections amounted to \$0.0056 per connection made; that the interest amounted to \$0.0012; dividends, \$0.0033; and undivided profits to \$0.0011.

This clearly showed that only a slight reduction could be made in the gross revenue of that company, and also that any changes which were made must be in the nature of a revision and a more equitable distribution of the amounts collected by the company from its various subscribers.

A number of discriminatory rates were discovered, and the Commission recommended to the company at that time that it discontinue all its irregular and preferential rates and all special privileges and particular rates to individual subscribers wherever located. This the company did.

Where the Property was located.

The valuation showed that the physical valuation of the plant in this State was over \$22,885,000; located in metropolitan Boston, \$4,463,000; suburban districts, \$6,446,000; 11 cities of over 50,000 inhabitants, \$6,872,000; in the thinly settled portions of the State, \$5,979,000. The valuation used for toll purposes was about \$9,642,000, or 40 per cent of the whole.

Professor Jackson reported in February, 1910, that the amount collected from various subscribers in various classes in the metropolitan and suburban districts varied from one-half a cent a call to 8 or even 10 cents per call; that the amount collected from the subscribers having unlimited service averaged about 2 cents a call, although many of the large users secured their calls for considerably less than 1 cent per call, whereas that charged to the subscribers to measured service, who constituted over one-half of the subscribers of the company, was from 6 to 10 cents per call. The average amount collected in the district was a little under $3\frac{1}{2}$ cents per call. This was

substantially the same amount that was collected throughout the country per call.

He recommended that if any rates were to be established for the metropolitan and suburban districts, it would be fair to the company to make a reduction in the gross revenue collected from \$300,000 to \$400,000 a year; that rates should be made to cover the districts which are used by a very large number of subscribers and not to cover a larger district which was only used by a very few subscribers, because then the rates used by the larger number could be very materially reduced. This to the end that persons who actually obtained the service should pay for the same rather than have it charged to some one who did not either desire or secure the service.

He also recommended that a maximum rate for small users should not exceed 5 cents per call, and that the 5-cent toll rate should be extended to a distance of 8 instead of 5 miles; that where subscribers were on measured or coin-box service, and were required to pay 5 cents a call, that should include the local tolls that were not in excess of 5 cents.

He called attention to the fact that the average amount collected in the metropolitan and suburban districts for each complete call was about $3\frac{1}{2}$ cents; that considerably more than one-half of the calls were made by unlimited business telephones and other unlimited telephones, although this class constituted relatively a small proportion of the total number of subscribers; that they were paying on the average only from one-half a cent to 2 cents a call, which was less than cost, whereas the subscribers to measured service were being charged from 6 to 10 cents a call.

He recommended that the 5-cent toll be extended to 8 miles, and that 5 cents additional should be added for each additional 8 miles air-line measurement, and that the toll calls everywhere throughout the State should be reduced from 10 to 5 cents when the distance did not exceed 5 miles air-line measurement.

He also recommended the reduction of the multi-party lines in order to secure better service, and that the company be requested to install two-party lines with divided ringing.

New Rates recommended.

A complete schedule of rates for all classes of service and all other service that the company rendered was recommended to the company, and will be found set forth at length in the annual report of 1910.

So far as the Commission has been able to ascertain, this was the first comprehensive schedule of rates that was made anywhere, based upon an accurate and complete valuation of the property of the company and the amount of property that was needed and used in each district for the particular classes of service, local as well as toll, and a comprehensive study of the cost of that particular service to the company.

The foundation principle on which the rates were established was practically a determination of the yearly cost to the company of installing complete the instrument, its necessary connections, etc., in order to give service in each particular class. It was then decided that a sufficient sum should be added to this to cover the actual operating cost of calls made, so that the subscriber who obtained that particular service should be entitled to secure enough calls at 5 cents a call to make up the total amount which the company had to collect yearly in order to pay for that particular service.

In the case of coin boxes, each additional call was 5 cents, but 5 cents when deposited in the boxes for local tolls went to make up the amount which the subscriber had to pay monthly, and made a part of the yearly payment which had to be made. Settlements for this service were made yearly, and any excess collected in one month was credited toward the total minimum amount due for the twelve months' service.

In the case of other measured service and private branch exchange service, after the total minimum amount required was collected at 5 cents a call, there was a reduction allowed for each additional call to 3 cents per call.

The Commission has been informed by one of the highest officials of the company, and by various experts, that this was the first comprehensive and the best study of valuations and rates that was ever made anywhere, and that it has since been used as a model throughout the country.

New Schedule of Rates accepted.

The company accepted these rates on Aug. 30, 1910, and agreed that certain of the new rates were to go into effect at once, and certain dates were agreed upon at which the old rates for the multi-party service should be discontinued. The time for this discontinuance was extended from time to time. The first date agreed upon on which the old rates should be canceled was May 1, 1911.

There were at this time in the metropolitan and suburban districts about 100,000 instruments and some 75,000 subscribers.

By December 31, 34,000 of these subscribers had changed to the new rates, and over 6,750 new subscribers had made contracts under the new rates.

New Schedule of Rates recommended for the Whole Commonwealth.

The Commission continued its study of rates and service, etc., throughout the Commonwealth, and in 1911 it recommended, and the company adopted, a new schedule of rates throughout the State.

These rates were based upon the grouping of various cities and towns into different classes according to the average number of subscribers in such localities, and the rates recommended were different in the different classes, being, of course, higher in the groups which had the largest number of subscribers and instruments connected with the exchanges, because such exchanges required a very largely increased amount of capital for each instrument, there were naturally a very much larger number of calls that could be made and were made for each instrument installed, and the cost of operation per call was necessarily larger than it was where there were a smaller number of instruments, and a smaller number of calls were made per instrument every year.

These rates were agreed to by the company, and were put into effect not only in Massachusetts but in Maine, New Hampshire, and Vermont.

The Commission at this time also recommended that toll

calls should not exceed 5 cents for 5 miles air-line measurement. This air-line measurement was recommended and adopted because many times it was cheaper for the company to use a much larger mileage of wire in order to make a call between two localities than it was to install a line between those localities when the line would be seldom used. For instance, it might be cheaper to make the connection around three sides of a square, and involve possibly as much as 10 or 15 miles of wire and two exchanges, in order to use existing lines, than it would be to install a line between two communities that were only 5 miles apart when there was very little communication between them.

It was also recommended that the rate should be 10 cents for a distance of from 5 miles to not exceeding 15 miles, and 15 cents for from 15 miles to not exceeding 25 miles.

The New Rates proved to be Popular.

A study made at this time, in 1911, showed that there had been a very large increase in the number of subscribers in the metropolitan and suburban districts, the increase being much greater than the average increase before that time.

While at first there were very many complaints made, meetings held, and even indignation meetings called by various societies and organizations and individuals, the particular complaint made being because of the discontinuance of the old six and ten-party lines, as the rates were studied by the public from time to time and by various business organizations, the justice of the rates, in the main, was conceded, and the agitation gradually died away.

There were hearings held before the Governor of the Commonwealth, reports ordered by the Senate and the House, and complaints were made to the Commission, not only by certain special towns and localities, but by a large number of individuals.

In the main they were all satisfied that the rates established were fair and just, and in a period of about five years substantially the whole community and every subscriber had acquiesced in the new rates, which not only increased the number of sub-

scribers, but established the rate on a fair basis for the first time, speaking generally, in the history of the company. The subscriber who secured the service paid for the same, or at any rate he did not charge any very large amount of the cost to any other subscriber or class of subscribers. For instance, whereas under the old rates the unlimited class of subscribers in the metropolitan and suburban districts were securing their calls for from one-half a cent to 2 cents a call, and the company was actually collecting the average $3\frac{1}{2}$ cents a call, the measured service had to pay from 6 to 10 cents a call; but after the new rates were established no subscriber had to pay more than 5 cents a call for local calls within his zone, and the average amount collected from the unlimited subscribers was from $2\frac{1}{2}$ to 3 cents a call.

Professor Jackson recommended to the Commission, and the Commission recommended to the company, that the unlimited business telephones, and all unlimited telephones where as a class the subscribers were having more than from 1,000 to 1,200 calls a year, should be discontinued, and they should be required to take measured service. This was because it was found that a very small proportion of the telephones, particularly the unlimited business telephones which required a very excessive amount of plant in order that the business could be satisfactorily and quickly conducted through a few hours in the day, were making two or three times as many calls per telephone as were other subscribers. Consequently, they were not paying their fair share of the total amount that had to be collected in order to enable the company to do business. The company did not adopt this suggestion.

There were a great many conferences, and a very large amount of study was put into the question of how much the company should be allowed to include in the rate for maintenance, obsolescence, repair, etc., in order to keep its plant up so that it could render adequate and satisfactory service to the public.

This subject was very carefully studied by the Commissioners, experts, Professor Jackson and Mr. Patterson, and also a number of business concerns like Stone & Webster and others, who had had large experience in public utilities, but who

were not connected with the telephone company, were consulted.

It was decided, on the whole, that it was fair to leave in the rate substantially 9 or 10 per cent to cover this depreciation until experience had shown that a smaller amount would be adequate.

This rate schedule, based upon a comprehensive valuation and appraisal of the company's property, has been, we are informed by the officials of the company, largely used as a model in other places throughout the country, and has been followed in a great many instances, notably in New York State, but only after a lapse of several years.

During 1912 there was practically no general complaint, and no hearings were held anywhere on the general subject of the rates as a whole.

There were, however, complaints in particular localities and districts, and the Commission held hearings on those particular complaints. These came at that time only from certain country districts claiming that their rates were too high.

A study in one place where there was considerable complaint, the town of Barnstable, showed that the cost of installing instruments was greater than the amount collected. It was further shown that in that district the total receipts collected, including the tolls collected, were not sufficient to pay for the cost of service and depreciation alone, without paying any sum either toward dividends or interest, although the plant in that district had cost the company something over \$450,000.

In fact, a further study showed that this was not an unusual condition; that in many cases in the country districts the total amount collected was not sufficient to pay interest on the plant after operating expenses and depreciation and repair had been paid for, but it was believed that the convenience of having the telephones installed in these districts was of very considerable value to subscribers elsewhere who might want to use them only occasionally, but when they did want to use them the fact that they could get service was of tremendous value at that particular time.

There was a further traffic count made in 1912 which showed that on the average, under the new rates as established, the

unlimited service was paying 2.8 cents for each completed call, and the subscribers to measured service were paying 4.9 cents for each completed call.

The Commission was continuing its study to see what changes could be made and what further reductions might fairly be made in the rates, when in 1913, by chapter 784, its powers and duties in relation to the companies conveying intelligence by electricity were transferred to the new Public Service Commission which was established by that chapter.

In 1906, when the Commission took over the supervision, it consisted of Messrs. McClintock, chairman, Parker and Manning. Mr. Sohier replaced Mr. McClintock in 1908, and Mr. Parker became chairman. Mr. Kemp succeeded Mr. Manning in 1909. After the resignation of Mr. Parker in 1911 Mr. Sohier acted as chairman, and Mr. Synan came on in 1912.

EXPENDITURES.

The following is a summary of the expenditures of the Massachusetts Highway Commission from Dec. 1, 1918, to Nov. 30, 1919: —

CONSTRUCTION EXPENDITURES.

TOWN OR CITY.	Amount.	Totals.
<i>Barnstable County.</i>		
Barnstable,	\$9,205 14	
Mashpee,	2,107 30	
Truro,	62 00	
Wellfleet,	61 15	
		\$11,435 59
<i>Berkshire County.</i>		
Becket,	\$15,542 07	
Cheshire,	70 23	
Dalton,	5,768 71	
Egremont,	22,007 66	
Great Barrington,	41,121 44	
Lanesborough,	5,116 22	
Sheffield,	4,497 36	
Stockbridge,	59 17	
Williamstown,	822 89	
Windsor,	58,180 34	
		153,186 09
<i>Amount carried forward,</i>		\$164,621 68

CONSTRUCTION EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amount brought forward,</i>		\$164,621 68
<i>Bristol County.</i>		
Freetown,	\$30 45	
Norton,	89 95	
Taunton,	23,074 61	23,195 01
<i>Essex County.</i>		
Danvers,	\$38,763 82	
Gloucester,	133 18	
Lynn,	44 22	
Newburyport,	3,214 38	
Saugus,	12,940 56	55,096 16
<i>Franklin County.</i>		
Conway,	\$69 21	
Deerfield,	351 70	
Greenfield,	6,081 53	
Northfield,	29 04	
Shelburne,	6,081 54	12,613 02
<i>Hampden County.</i>		
Blandford,	\$1,373 51	
Chicopee,	1 18	
Palmer,	318 32	
Russell,	667 73	2,360 74
<i>Hampshire County.</i>		
Amherst,	\$5,154 54	
Cummington,	32 58	
Granby,	36 99	
Huntington,	35 32	
Northampton,	75 75	5,335 18
<i>Middlesex County.</i>		
Ashby,	\$7,340 61	
Ayer,	8,694 15	
Billerica	10,188 05	
Groton,	36 37	
Lexington,	21 87	
Littleton,	13 26	26,294 31
<i>Norfolk County.</i>		
Braintree,	\$44,009 82	44,009 82
<i>Amount carried forward,</i>		\$333,525 92

CONSTRUCTION EXPENDITURES — *Concluded.*

TOWN OR CITY.	Amount.	Totals.
<i>Amount brought forward,</i> . . . . .	. . . . .	\$333,525 92
<i>Plymouth County.</i>		
East Bridgewater,	\$11 39	
Hingham,	13 79	
Kingston,	1,057 63	
Norwell,	13 80	
Wareham,	6,760 55	
		7,857 16
<i>Worcester County.</i>		
Athol,	\$55,258 13	
Hopedale,	9 02	
Northborough,	130 95	
Northbridge,	9,184 46	
Oakham,	441 83	
Petersham,	117,298 42	
Rutland,	157 33	
Warren,	13,022 12	
Westminster,	1,651 02	
		197,153 28
<i>Total,</i> . . . . .	. . . . .	\$538,536 36

EXPENDITURES UNDER "SMALL TOWN" ACTS.

[Chapter 344 of the General Acts of 1917, Part I.]

TOWN OR CITY.	Amount.	Totals.
<i>Berkshire County.</i>		
Becket,	\$1,271 21	
Hinsdale,	20 00	
New Marlborough,	554 05	
Richmond,	472 50	
Washington,	700 00	
		\$3,017 76
<i>Bristol County.</i>		
Berkley,	\$15 00	
Westport,	2,000 00	
		2,015 00
<i>Franklin County.</i>		
Conway,	\$45 75	
Hawley,	370 00	
Heath,	1,638 07	
Leverett,	1,000 00	
Monroe,	2,300 00	
Warwick,	1,000 00	
		6,353 82
<i>Hampden County.</i>		
Granville,	\$664 78	
		664 78
<i>Hampshire County.</i>		
Greenwich,	\$200 00	
		200 00
<i>Worcester County.</i>		
Templeton,	\$600 00	
		600 00
Total,		\$12,851 36

EXPENDITURES UNDER CHAPTER 221, GENERAL ACTS OF 1915, FOR THE
CONSTRUCTION OF ROADS IN WESTERN MASSACHUSETTS COUNTIES.

TOWN OR CITY.	Amount.	Totals.
<i>Route No. 1.</i>		
Great Barrington,	\$5,715 80	\$5,715 80
<i>Route No. 2.</i>		
Cummington,	\$2,212 03	
Windsor,	513 29	
Dalton,	207 46	
Goshen,	1,866 87	
		4,799 65
<i>Route No. 3.</i>		
Otis,	\$40 98	
Becket,	151 19	
		192 17
<i>Route No. 4.</i>		
Hinsdale,	\$47,681 43	
Washington,	18,800 42	
		66,481 85
<i>Route No. 5.</i>		
Worthington,	\$780 65	
Huntington,	224 44	
Cummington,	140 46	
		1,145 55
<i>Route No. 8.</i>		
Belchertown,	\$3,701 84	
Ware,	151 39	
Enfield,	210 65	
Palmer,	345 14	
		4,409 02
<i>Route No. 9.</i>		
Southwick,	\$654 06	
Agawam,	125 21	
Granville,	10 61	
		789 88
<i>Route No. 10.</i>		
Goshen,	\$35 80	
Ashfield,	8,439 78	
Conway,	15,884 98	
Deerfield,	80 33	
		22,440 89
<i>Route No. 11.</i>		
Gill,	\$9,868 43	
		9,868 43
<i>Amount carried forward,</i>		\$115,843 24

EXPENDITURES UNDER CHAPTER 221, GENERAL ACTS OF 1915, FOR THE
CONSTRUCTION OF ROADS IN WESTERN MASSACHUSETTS COUNTIES
— *Concluded.*

TOWN OR CITY.	Amount.	Totals.
<i>Amount brought forward,</i>		\$115,843 24
<i>Route No. 12.</i>		
Petersham,	\$69 95	
Athol,	39 18	
Oakham,	7 70	
Barre,	31 58	
		148 41
<i>Route No. 13.</i>		
Grafton,	\$8,315 48	
Upton,	78 31	
Hopedale,	7 42	
		8,401 21
<i>Route No. 14.</i>		
Warwick,	\$3,287 74	
		3,287 74
<i>Route No. 16.</i>		
Wales,	\$16 52	
		16 52
<i>Route No. 17.</i>		
Williamsburg,	\$2,581 06	
Northampton,	5 55	
Chesterfield,	228 24	
		2,814 85
<i>Total,</i>		\$130,511 97

REPAIR AND MAINTENANCE EXPENDITURES.

[Chapter 208, Special Acts of 1916.]

TOWN OR CITY.	Amount.	Totals.
<i>Barnstable County.</i>		
Barnstable,	\$2,077 70	
Bourne,	1,140 12	
Brewster,	758 96	
Chatham,	1,441 45	
Dennis,	831 82	
Eastham,	612 16	
Falmouth,	2,189 90	
Harwich,	650 94	
Mashpee,	745 31	
Orleans,	407 63	
Provincetown,	687 52	
Sandwich,	840 37	
Truro,	582 62	
Wellfleet,	598 43	
Yarmouth,	607 70	
		\$14,172 63
<i>Berkshire County.</i>		
Adams,	\$537 33	
Becket,	3,289 45	
Cheshire,	1,401 07	
Clarksburg,	980 68	
Dalton,	276 71	
Egremont,	574 32	
Florida,	3,525 10	
Great Barrington,	1,260 46	
Hancock,	566 69	
Hinsdale,	30 88	
Lanesborough,	654 45	
Lee,	1,960 12	
Lenox,	2,644 56	
New Marlborough,	85 81	
North Adams,	3,760 75	
Pittsfield,	2,322 43	
Richmond,	845 00	
Savoy,	627 35	
Sheffield,	2,266 10	
Stockbridge,	830 14	
Williamstown,	319 64	
Windsor,	4 60	
		28,763 64
<i>Bristol County.</i>		
Acushnet,	\$656 90	
Attleborough,	1,126 14	
Berkley,	339 83	
<i>Amounts carried forward,</i>	\$2,121 87	\$42,936 27

REPAIR AND MAINTENANCE EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$2,121 87	\$42,936 27
Dartmouth,	1,285 31	
Dighton,	497 73	
Easton, . . . . .	. 58 68	
Fairhaven,	333 69	
Fall River,	11 86	
Freetown,	511 48	
Mansfield,	359 30	
North Attleborough,	382 75	
Norton,	1,154 68	
Raynham,	801 37	
Rehoboth,	917 37	
Seekonk,	1,501 51	
Somerset,	2,017 18	
Swansea,	1,226 03	
Taunton,	1,910 92	
Westport,	1,446 90	
		16,539 63
<i>Dukes County.</i>		
Chilmark,	\$2,039 92	
Edgartown,	318 43	
Gay Head,	1,067 25	
Oak Bluffs,	386 62	
Tisbury,	866 87	
West Tisbury,	1,218 98	
		5,898 07
<i>Essex County.</i>		
Amesbury,	\$1,113 37	
Andover,	2,064 53	
Beverly,	1,762 84	
Danvers,	83 19	
Essex,	431 72	
Gloucester,	1,791 44	
Groveland,	384 32	
Hamilton,	1,460 85	
Haverhill,	2,668 68	
Ipswich,	1,497 44	
Lawrence,	464 59	
Lynn,	866 40	
Merrimac,	546 94	
Methuen,	1,640 76	
Middleton,	233 46	
Newbury,	1,449 43	
Newburyport,	716 05	
North Andover,	2,230 37	
Rockport,	1,852 30	
<i>Amounts carried forward,</i>	\$23,258 68	\$65,373 97

REPAIR AND MAINTENANCE EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i> . . .	\$23,258 68	\$65,373 97
Rowley,	1,409 20	
Salem,	688 24	
Salisbury,	969 29	
Saugus,	1,141 01	
Swampscott,	411 28	
Wenham,	414 16	
West Newbury,	876 52	
		29,168 38
<i>Franklin County.</i>		
Ashfield,	\$157 19	
Bernardston,	3,031 03	
Buckland,	716 67	
Charlemont,	2,379 33	
Colrain,	333 12	
Conway,	881 02	
Deerfield,	2,092 41	
Erving,	802 27	
Greenfield,	332 83	
Montague,	993 14	
Northfield,	366 80	
Orange,	680 67	
Shelburne,	1,464 69	
Sunderland,	568 69	
Whately,	618 16	
		15,418 02
<i>Hampden County.</i>		
Agawam,	\$4,284 31	
Blandford,	382 69	
Brimfield,	520 95	
Chester,	3,039 11	
Chicopee,	1,663 07	
East Longmeadow,	1,457 67	
Holyoke,	826 61	
Monson,	164 51	
Palmer,	3,643 58	
Russell,	8,488 92	
Wales,	521 31	
West Springfield,	433 73	
Westfield,	2,340 20	
Wilbraham,	1,184 21	
		22,950 87
<i>Hampshire County.</i>		
Amherst,	\$1,144 36	
Belchertown,	499 48	
Easthampton,	299 86	
<i>Amounts carried forward,</i>	\$1,943 70	\$132,911 24

REPAIR AND MAINTENANCE EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$1,943 70	\$132,911 24
Goshen,	67 32	
Granby,	791 90	
Hadley,	1,055 49	
Hatfield,	145 50	
Huntington,	2,329 95	
Northampton,	767 90	
South Hadley,	1,584 43	
Southampton,	110 08	
Ware,	675 18	
Williamsburg,	106 48	
		9,577 93
<i>Middlesex County.</i>		
Acton,	\$6,106 60	
Arlington,	224 83	
Ashby,	928 86	
Ashland,	1,150 09	
Ayer,	806 26	
Bedford,	831 42	
Billerica,	1,658 69	
Boxborough,	1,284 85	
Burlington,	2,762 34	
Chelmsford,	5,192 07	
Concord,	2,311 76	
Dracut,	1,245 94	
Framingham,	2,323 94	
Groton,	253 66	
Holliston,	629 52	
Hudson,	379 02	
Lexington,	1,146 49	
Lincoln,	133 52	
Littleton,	3,967 98	
Lowell,	1,787 73	
Malden,	94 75	
Marlborough,	1,479 55	
Medford,	218 89	
Melrose,	288 20	
Natick,	641 88	
Newton,	1,932 51	
North Reading,	739 91	
Pepperell,	180 95	
Reading,	962 62	
Shirley,	497 99	
Somerville,	350 63	
Stoneham,	1,176 82	
Sudbury,	888 26	
<i>Amounts carried forward,</i>	\$44,578 53	\$142,489 17

REPAIR AND MAINTENANCE EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i> . . .	\$44,578 53	\$142,489 17
Tewksbury,	594 87	
Townsend,	399 33	
Tyngsborough,	1,990 69	
Watertown,	427 82	
Wayland,	348 28	
Westford,	1,708 58	
Weston,	487 59	
Wilmington,	495 62	
Winchester,	1,146 79	
Woburn,	1,876 88	
		54,054 98
<i>Nantucket County.</i>		
Nantucket,	\$2,140 23	2,140 23
<i>Norfolk County.</i>		
Avon,	\$117 97	
Bellingham,	551 59	
Braintree,	313 59	
Canton,	1,283 07	
Cohasset,	433 47	
Dedham,	896 70	
Dover,	879 30	
Foxborough,	938 89	
Franklin,	898 81	
Holbrook,	211 18	
Milton,	214 21	
Needham,	402 45	
Norfolk,	70 83	
Norwood,	499 70	
Plainville,	212 88	
Quincey,	690 30	
Randolph,	472 60	
Sharon,	140 05	
Stoughton,	495 65	
Walpole,	701 32	
Wellesley,	455 95	
Westwood,	323 65	
Weymouth,	1,263 20	
Wrentham,	1,327 39	
		13,794 75
<i>Plymouth County.</i>		
Abington,	\$648 50	
Bridgewater,	611 73	
Brockton,	428 35	
Duxbury,	366 60	
<i>Amounts carried forward,</i> . . .	\$2,055 18	\$212,479 13

REPAIR AND MAINTENANCE EXPENDITURES — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i> . . .	\$2,055 18	\$212,479 13
East Bridgewater,	277 23	
Hanover,	407 49	
Hingham,	357 55	
Kingston,	138 36	
Lakeville,	824 45	
Marion,	555 85	
Marshfield,	435 60	
Mattapoisett,	371 78	
Middleborough,	1,020 41	
Pembroke,	220 97	
Plymouth,	930 76	
Rochester,	526 25	
Rockland,	882 07	
Scituate,	306 12	
Wareham,	1,840 80	
West Bridgewater,	450 83	
Whitman,	230 13	
		11,831 83
<i>Suffolk County.</i>		
Boston,	\$651 88	
Chelsea,	1,175 89	
Revere,	1,657 01	
		3,484 78
<i>Worcester County.</i>		
Ashburnham,	\$4,022 93	
Athol,	413 89	
Auburn,	3,681 23	
Barre,	1,745 91	
Blackstone,	1,890 22	
Brookfield,	1,387 40	
Charlton,	4,120 66	
Douglas,	466 90	
Dudley,	707 04	
Fitchburg,	71 88	
Gardner,	371 23	
Grafton,	2,361 16	
Hardwick,	194 93	
Harvard,	748 40	
Holden,	2,111 90	
Hopedale,	55 48	
Lancaster,	742 10	
Leicester,	2,181 39	
Leominster,	1,179 21	
Lunenburg,	1,785 10	
Mendon,	202 43	
<i>Amounts carried forward,</i> . . .	\$30,541 39	\$227,795 74

REPAIR AND MAINTENANCE EXPENDITURES — *Concluded.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$30,541 39	\$227,795 74
Milford,	517 04	
Millbury,	993 94	
Millville,	817 11	
New Braintree,	1 75	
North Brookfield,	608 49	
Northborough,	549 43	
Northbridge,	324 10	
Oakham,	496 12	
Oxford,	874 95	
Paxton,	1,898 78	
Petersham,	248 40	
Phillipston,	312 88	
Princeton,	40 00	
Rutland,	1,263 43	
Shrewsbury,	1,231 82	
Southborough,	1,016 84	
Southbridge,	230 21	
Spencer,	1,233 30	
Sterling,	1,544 57	
Sturbridge,	1,158 82	
Sutton,	1,359 33	
Templeton,	1,183 37	
Upton,	590 25	
Uxbridge,	1,248 43	
Warren,	1,245 34	
Webster,	259 04	
West Boylston,	424 50	
West Brookfield,	954 35	
Westborough,	832 48	
Westminster,	4,797 89	
Winchendon,	4,580 88	
Worcester,	1,449 67	
	64,728 90	
		\$292,524 64

EXPENDITURES UNDER THE PROVISIONS OF CHAPTER 153,
SPECIAL ACTS OF 1919.

REPAIRS OF STATE HIGHWAYS.

TOWN OR CITY.	Amount.	Totals.
<i>Barnstable County.</i>		
Barnstable,	\$15,664 41	
Bourne,	3,636 63	
Brewster,	8,504 91	
Chatham,	986 81	
Dennis,	1,598 11	
Eastham,	1,353 72	
Falmouth,	2,673 99	
Harwich,	1,804 64	
Mashpee,	801 37	
Orleans,	375 74	
Provincetown,	936 68	
Sandwich,	6,818 18	
Truro,	2,194 38	
Wellfleet,	1,263 05	
Yarmouth, North,	1,400 72	
Yarmouth, South,	8,061 81	
		\$58,075 15
<i>Berkshire County.</i>		
Adams,	\$591 11	
Becket,	112,361 20	
Cheshire,	4,642 07	
Clarksburg,	1,615 46	
Dalton,	1,823 18	
Egremont,	1,246 79	
Florida,	11,828 94	
Great Barrington,	3,219 97	
Hancock,	67,314 02	
Hinsdale,	490 53	
Lanesborough,	716 79	
Lee,	3,196 77	
Lenox,	3,204 64	
New Marlborough,	86 42	
North Adams,	9,632 97	
Pittsfield,	4,619 41	
Richmond,	2,816 33	
Savoy,	1,496 62	
Stockbridge,	1,631 77	
Sheffield,	4,228 08	
Williamstown,	1,002 34	
Windsor,	565 64	
		238,331 05
<i>Amount carried forward,</i>		\$296,406 20

REPAIRS OF STATE HIGHWAYS — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amount brought forward,</i>		\$296,406 20
<i>Bristol County.</i>		
Acushnet,	\$1,307 26	
Attleboro,	1,088 57	
Berkley,	167 80	
Dartmouth,	12,070 78	
Dighton,	2,542 81	
Easton,	300 82	
Fairhaven,	1,884 38	
Fall River,	11 08	
Freetown,	660 41	
Mansfield,	6,370 58	
North Attleborough,	2,134 33	
Norton,	3,122 91	
Raynham,	1,022 31	
Rehoboth,	3,002 25	
Seekonk,	16,046 85	
Somerset,	4,336 86	
Swansea,	7,022 59	
Taunton,	2,866 80	
Westport,	715 90	
		66,675 29
<i>Dukes County.</i>		
Chilmark,	\$6,256 64	
Edgartown,	101 60	
Gay Head,	249 18	
Oak Bluffs,	420 02	
Tisbury,	1,509 70	
West Tisbury,	2,229 57	
		10,766 71
<i>Essex County.</i>		
Amesbury,	\$2,080 65	
Andover,	1,497 60	
Beverly,	6,196 60	
Essex,	917 15	
Danvers,	36 73	
Gloucester,	2,288 17	
Groveland,	1,442 87	
Hamilton,	40,009 73	
Haverhill,	3,687 34	
Ipswich,	45,279 02	
Lawrence,	664 31	
Lynn,	2,159 84	
Merrimac,	1,587 29	
Methuen,	2,907 68	
Middleton,	594 44	
<i>Amounts carried forward,</i>	\$111,349 42	\$373,848 20

REPAIRS OF STATE HIGHWAYS — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$111,349 42	\$373,848 20
Newbury,	2,526 09	
Newburyport,	3,616 41	
North Andover,	3,339 64	
Rockport,	240 29	
Rowley,	3,727 39	
Salem,	1,817 62	
Salisbury,	5,990 21	
Saugus,	1,842 31	
Swampscott,	889 26	
Wenham,	1,822 21	
West Newbury,	3,545 61	
		140,706 46
<i>Franklin County.</i>		
Ashfield,	\$1,176 06	
Bernardston,	3,645 13	
Buckland,	1,354 50	
Charlemont,	6,892 03	
Colrain,	830 41	
Conway,	1,145 37	
Deerfield,	6,446 21	
Erving,	3,183 52	
Greenfield,	6,368 04	
Montague,	1,452 27	
Northfield,	2,512 33	
Orange,	2,617 74	
Shelburne,	4,172 10	
Sunderland,	2,605 71	
Whately,	7,898 82	
		52,300 24
<i>Hampden County.</i>		
Agawam,	\$804 58	
Blandford,	1,512 99	
Brimfield,	1,044 91	
Chester,	1,683 57	
Chicopee,	650 25	
East Longmeadow,	1,091 23	
Holyoke,	3,425 31	
Monson,	401 29	
Palmer,	11,973 21	
Russell,	4,381 69	
Wales,	66 63	
Westfield,	2,677 21	
West Springfield,	637 36	
Wilbraham,	1,439 34	
		31,789 57
<i>Amount carried forward,</i>		\$598,644 47

REPAIRS OF STATE HIGHWAYS — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amount brought forward,</i>		\$598,644 47
<i>Hampshire County.</i>		
Amherst,	\$1,112 40	
Belchertown,	961 38	
Easthampton,	5,787 04	
Goshen,	903 34	
Granby,	2,803 85	
Hadley,	1,250 20	
Hatfield,	9,849 28	
Huntington,	2,093 76	
Northampton,	1,094 60	
South Hadley,	2,586 68	
Southampton,	486 50	
Ware,	1,968 82	
Williamsburg,	4,019 73	
		34,917 58
<i>Middlesex County.</i>		
Acton,	\$69,156 69	
Arlington,	63 71	
Ashby,	772 02	
Ashland,	941 43	
Ayer,	790 28	
Bedford,	556 59	
Billerica,	1,622 46	
Boxborough,	1,312 61	
Burlington,	2,218 76	
Chelmsford,	4,574 23	
Concord,	75,371 41	
Dracut,	2,740 84	
Framingham,	2,116 02	
Groton,	1,313 32	
Holliston,	1,353 87	
Hudson,	752 76	
Lexington,	2,263 72	
Lincoln,	1,716 65	
Littleton,	19,921 49	
Lowell, East,	56 78	
Lowell, North,	1,397 08	
Lowell, South,	2,106 77	
Malden,	179 04	
Marlborough,	4,780 05	
Medford,	461 29	
Melrose,	683 13	
Natick,	1,449 08	
Newton,	947 02	
<i>Amounts carried forward,</i>	\$201,639 00	\$633,562 05

REPAIRS OF STATE HIGHWAYS — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$201,639 00	\$633,562 05
North Reading,	1,132 26	
Pepperell,	2,489 55	
Reading,	1,711 18	
Shirley,	982 63	
Somerville,	513 99	
Stoneham,	1,416 54	
Sudbury,	4,110 14	
Tewksbury,	31,298 98	
Townsend,	4,623 19	
Tyngsborough,	3,166 34	
Watertown,	498 16	
Wayland,	791 88	
Westford,	2,445 06	
Weston,	1,290 67	
Wilmington,	10,960 38	
Winchester,	1,953 85	
Woburn,	2,947 51	
		273,951 41
<i>Nantucket County.</i>		
Nantucket,	\$2,826 39	
		2,826 39
<i>Norfolk County.</i>		
Avon,	\$461 45	
Bellingham,	727 48	
Braintree,	441 58	
Canton,	6,910 80	
Cohasset,	15,868 04	
Dedham,	1,382 21	
Dover,	1,513 84	
Foxborough,	6,230 90	
Franklin,	1,537 42	
Holbrook,	582 66	
Milton,	355 89	
Needham,	1,141 94	
Norfolk,	310 98	
Norwood,	1,565 26	
Plainville,	623 09	
Quincy,	22,650 92	
Randolph,	29,188 63	
Sharon,	210 01	
Stoughton,	11,326 38	
Walpole,	2,088 52	
Wellesley,	548 17	
<i>Amounts carried forward,</i>	\$105,656 18	\$910,339 85

REPAIRS OF STATE HIGHWAYS — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$105,656 18	\$910,339 85
Westwood,	1,231 61	
Weymouth,	32,183 47	
Wrentham,	7,405 80	
		146,487 05
<i>Plymouth County.</i>		
Abington,	\$603 83	
Bridgewater,	508 07	
Brockton,	593 71	
Duxbury,	12,175 26	
East Bridgewater,	583 10	
Hanover,	1,914 37	
Hingham,	4,307 74	
Kingston,	1,733 81	
Lakeville,	1,194 04	
Marion,	2,095 85	
Marshfield,	29,396 74	
Mattapoisett,	977 20	
Middleborough,	15,339 22	
Pembroke,	341 18	
Plymouth,	2,003 74	
Rochester,	5,446 74	
Rockland,	291 94	
Scituate,	1,040 55	
Wareham,	21,978 48	
West Bridgewater,	278 61	
Whitman,	71 16	
		102,875 34
<i>Suffolk County.</i>		
Boston,	\$1,199 08	
Chelsea,	605 86	
Revere, East,	604 54	
Revere, West	409 14	
Revere, North,	1,491 38	
		4,310 00
<i>Worcester County.</i>		
Ashburnham,	\$10,521 02	
Athol,	1,863 72	
Auburn,	6,739 45	
Barre,	3,622 92	
Blackstone,	3,103 85	
Brookfield,	2,356 56	
Charlton,	4,822 16	
Douglas,	832 43	
Dudley,	2,004 60	
<i>Amounts carried forward,</i>	\$35,866 71	\$1,164,012 24

REPAIRS OF STATE HIGHWAYS — *Concluded.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$35,866 71	\$1,164,012 24
Fitchburg,	3,778 88	
Gardner,	1,632 87	
Grafton,	5,000 65	
Hardwick,	610 64	
Harvard,	1,393 26	
Holden,	2,247 63	
Hopedale,	118 22	
Lancaster,	784 82	
Leicester,	4,153 82	
Leominster,	1,471 59	
Lunenburg,	6,312 43	
Milford,	1,284 00	
Millbury,	1,675 60	
Mendon,	328 24	
Millville,	1,651 10	
New Braintree,	34 34	
Northborough,	3,371 22	
Northbridge,	566 05	
North Brookfield,	1,098 44	
Oakham,	2,688 46	
Oxford,	1,810 50	
Paxton,	1,256 17	
Petersham,	2,740 65	
Phillipston,	1,665 49	
Princeton,	1,336 06	
Rutland,	1,140 88	
Shrewsbury,	2,544 86	
Southborough,	1,727 27	
Southbridge,	684 42	
Spencer,	1,556 26	
Sterling,	2,468 45	
Sturbridge,	1,519 70	
Sutton,	2,349 83	
Templeton,	3,784 44	
Upton,	341 70	
Uxbridge,	2,474 31	
Warren,	61,110 72	
Webster,	1,181 81	
Westborough,	1,575 81	
West Boylston,	1,586 47	
West Brookfield,	20,982 88	
Westminster,	8,083 48	
Winchendon,	7,842 51	
Worcester,	3,158 72	
		210,992 36
		\$1,375,004 60

REPAIR AND MAINTENANCE OF TOWN AND COUNTY WAYS.

[Chapter 525, Acts of 1910.]

TOWN OR CITY.	Amount.	Totals.
<i>Barnstable County.</i>		
Dennis,	\$30 24	
Harwich,	813 67	
Provincetown,	930 41	
Sandwich,	1,983 33	
Truro,	3 00	
		\$3,760 65
<i>Berkshire County.</i>		
Cheshire,	\$920 66	
Hinsdale,	467 13	
Lanesborough,	975 58	
New Ashford,	617 31	
New Marlborough,	2,232 50	
Peru,	548 63	
Richmond,	3,159 18	
Savoy,	1,000 00	
Sheffield,	1,387 38	
Williamstown,	200 38	
		11,508 75
<i>Bristol County.</i>		
Acushnet,	\$2,000 00	
Berkley,	4,500 00	
Dighton,	3,000 00	
Seekonk,	4,000 00	
Westport,	3,000 00	
		16,500 00
<i>Essex County.</i>		
Andover,	\$4,986 12	
Boxford,	125 10	
Danvers,	3,115 53	
Essex,	1,000 00	
Georgetown,	2,500 00	
Ipswich,	3,312 05	
Lynnfield,	4,211 32	
Merrimac,	1,500 00	
Methuen,	4,000 00	
Middleton,	423 25	
Newbury,	3,275 29	
North Andover,	464 28	
Rowley,	4,218 37	
Saugus,	1,825 00	
Topsfield,	5,222 47	
West Newbury,	1,000 00	
		41,178 78
<i>Amount carried forward,</i>		\$72,948 18

REPAIR AND MAINTENANCE, ETC. — *Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amount brought forward,</i>		\$72,948 18
<i>Franklin County.</i>		
Ashfield,	\$792 64	
Buckland,	1,500 00	
Deerfield,	734 04	
New Salem,	3,186 50	
Shelburne,	563 05	
		6,776 23
<i>Hampden County.</i>		
Agawam,	\$1,468 35	
Brimfield,	2,398 10	
Chester,	938 88	
Hampden,	800 00	
Ludlow,	4,500 00	
Monson,	2,046 64	
Southwick,	50 00	
Tolland,	66 00	
West Springfield,	12,128 48	
Wilbraham,	1,546 78	
		25,943 19
<i>Hampshire County.</i>		
Easthampton,	\$1,993 20	
Huntington,	1,768 35	
Pelham,	750 00	
Plainfield,	3,416 14	
		7,927 69
<i>Middlesex County.</i>		
Acton,	\$803 67	
Arlington,	2,590 44	
Ashland,	1,499 93	
Ayer,	5,428 98	
Bedford,	766 67	
Belmont,	167 66	
Billerica,	1,817 12	
Burlington,	2,291 51	
Carlisle,	533 34	
Chelmsford,	6,666 67	
Concord,	7,142 85	
Dracut,	6,400 00	
Framingham,	1,999 67	
Holliston,	2,171 20	
Hopkinton,	3,000 00	
Lincoln,	5,000 00	
Littleton,	320 50	
Maynard,	1,483 67	
Natick,	1,500 00	
<i>Amounts carried forward,</i>	\$51,583 88	\$113,595 29

REPAIR AND MAINTENANCE, ETC.—*Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$51,583 88	\$113,595 29
North Reading,	2,885 00	
Pepperell,	700 00	
Sherborn,	500 00	
Shirley,	8,532 60	
Stoneham,	1,598 11	
Stow,	1,260 70	
Sudbury,	3,492 63	
Tewksbury,	4,687 93	
Townsend,	500 00	
Tyngsborough,	632 21	
Wakefield,	3,388 91	
Wayland,	4,245 96	
Westford,	2,864 06	
Wilmington,	1,000 00	
		87,871 99
<i>Nantucket County.</i>		
Nantucket,	\$2,500 00	2,500 00
<i>Norfolk County.</i>		
Avon,	\$2,847 44	
Bellingham,	2,023 20	
Franklin,	1,500 00	
Medfield,	1,500 00	
Medway,	1,000 00	
Millis,	3,000 00	
Needham,	1,483 82	
Norfolk,	1,800 00	
Norwood,	5,911 04	
Randolph,	5,715 00	
Sharon,	5,000 00	
Westwood,	2,000 00	
Wrentham,	1,800 00	
		35,580 50
<i>Plymouth County.</i>		
Bridgewater,	\$5,000 00	
Carver,	3,375 00	
East Bridgewater,	387 20	
Halifax,	3,356 90	
Lakeville,	772 80	
Pembroke,	800 00	
Plympton,	250 00	
West Bridgewater,	146 75	
		14,088 65
<i>Amount carried forward,</i>		\$253,636 43

REPAIR AND MAINTENANCE, ETC.—*Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amount brought forward,</i>		\$253,636 43
<i>Worcester County.</i>		
Blackstone,	\$2,500 00	
Bolton,	540 00	
Brookfield,	2,603 78	
Charlton,	1,553 02	
Dana,	1,100 00	
Dudley,	8,674 46	
Gardner,	2,500 00	
Hardwick,	2,600 00	
Harvard,	3,180 30	
Holden,	1,989 13	
Hubbardston,	2,497 07	
Leicester,	12,667 47	
Lunenburg,	3,457 07	
Mendon,	1,000 00	
New Braintree,	1,072 34	
Northbridge,	94 00	
Oxford,	4,512 54	
Paxton,	2,500 00	
Princeton,	1,167 38	
Rutland,	762 09	
Southbridge,	2,791 87	
Sterling,	1,300 00	
Sturbridge,	4,835 94	
Templeton,	348 93	
Upton,	1,749 70	
Warren,	305 75	
West Brookfield,	722 98	
	69,025 82	
		\$322,662 25

REPAIR AND MAINTENANCE, ETC.—Continued.

[Chapter 155, General Acts of 1918.]

TOWN OR CITY.	Amount.	Totals.
<i>Berkshire County.</i>		
Alford,	\$734 24	
Becket,	4,835 26	
Florida,	1,314 72	
Hancock,	328 96	
Hinsdale,	148 75	
Monterey,	1,862 02	
Otis,	1,359 92	
Sandisfield,	1,883 36	
Savoy,	2,076 74	
Tyringham,	1,396 20	
Washington,	2,033 17	
West Stockbridge,	2,718 92	
Windsor,	2,515 97	
		\$23,208 23
<i>Essex County.</i>		
Boxford,	\$2,645 01	
Middleton,	1,361 89	
		4,006 90
<i>Franklin County.</i>		
Ashfield,	\$4,602 23	
Charlemont,	2,132 88	
Colrain,	2,604 40	
Conway,	2,395 20	
Gill,	1,545 10	
Hawley,	3,110 49	
Heath,	1,500 00	
Leyden,	1,455 49	
Monroe,	180 80	
New Salem,	2,119 48	
Rowe,	2,595 17	
Shutesbury,	1,690 05	
Warwick,	1,845 66	
Wendell,	2,261 37	
		30,038 32
<i>Hampden County.</i>		
Blandford,	\$2,444 80	
Brimfield,	2,127 66	
Chester,	2,046 12	
Granville,	6,296 56	
Hampden,	1,527 45	
Holland,	1,266 45	
<i>Amounts carried forward,</i>	\$15,709 04	\$57,253 45

REPAIR AND MAINTENANCE, ETC.—*Continued.*

TOWN OR CITY.	Amount.	Totals.
<i>Amounts brought forward,</i>	\$15,709 04	\$57,253 45
Montgomery,	918 39	
Southwick,	3,848 46	
Tolland,	1,060 36	
Wales,	504 11	
		22,040 36
<i>Hampshire County.</i>		
Belchertown,	\$2,160 90	
Chesterfield,	1,487 76	
Cummington,	3,000 00	
Enfield,	1,550 45	
Goshen,	2,046 56	
Granby,	1,722 10	
Greenwich,	1,623 72	
Hatfield,	1,428 99	
Huntington,	2,001 83	
Middlefield,	1,823 82	
Pelham,	1,360 65	
Plainfield,	2,495 04	
Prescott,	1,572 75	
Southampton,	2,541 64	
Westhampton,	740 40	
Williamsburg,	2,571 33	
Worthington,	3,899 94	
		34,027 88
<i>Middlesex County.</i>		
Boxborough,	\$1,300 00	
Carlisle,	936 22	
Dunstable,	1,750 00	
		3,986 22
<i>Norfolk County.</i>		
Bellingham,	\$2,050 00	
Medway,	2,000 00	
		4,050 00
<i>Worcester County.</i>		
Berlin,	\$1,850 00	
Bolton,	2,500 00	
Boylston,	1,550 00	
Douglas,	2,654 70	
Hubbardston,	2,465 45	
Mendon,	2,150 00	
Phillipston,	2,072 07	
Royalston,	2,473 78	
Rutland,	2,096 15	
Sutton,	2,530 41	
		22,342 56
		\$143,700 47

REPAIR AND MAINTENANCE, ETC.—*Concluded.*

Repairs of State highways,	\$1,375,004	60
Expenditures under chapter 525, Acts of 1910,	322,662	25
Expenditures under chapter 155, General		
Acts of 1918,	143,700	47
Cost of engineering,	199,109	32
Marking routes,	1,323	45
Analysis of tar and oil,	1,334	35
Canceled checks,	12	50
Miscellaneous,	45	00
		\$2,043,191
		94

MACHINERY ACCOUNT.

Rent, light, heat and fuel,	\$954	20
Salaries, labor and expense,	14,471	94
Freight and express,	919	78
Tools and apparatus,	1,551	17
Materials and repairs,	1,949	70
Supplies, parts and fittings,	11,862	37
Miscellaneous items,	716	70
Gasoline,	2,838	55
Tubes and tires,	424	73
Lubricants,	319	16
Garage and storage,	853	87
Repairs and parts,	5,253	16
Equipment,	311	22
Motorcycles,	40	79
Miscellaneous items,	558	39
1 auto,	175	00
4 steam rollers,	13,350	00
9 kettles,	1,120	00
5 road machines,	1,230	00
12 road drags,	420	00
1 10-ton crankshaft and flywheels,	196	00
1 stationary crushing plate,	125	00
2 smoke stacks,	75	00
2 gravel screens,	21	00
		59,737
		73
<i>Amount carried forward,</i>		\$2,102,929
		67

<i>Amount brought forward,</i>	\$2,102,929 67
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AUTOMOBILE DEPARTMENT EXPENSE.

Salaries of clerks and clerical assistants,	\$114,252 30
Number plates, motorcycle seals and speed signs,	. . . . .	50,759 58
Printing,	. . . . .	22,026 12
Postage,	. . . . .	20,172 29
Typewriters purchased and rented,	. . . . .	3,182 64
Office supplies,	. . . . .	9,505 46
Cartage and storage,	. . . . .	1,039 26
4 motor fans,	. . . . .	103 72
Pay rolls,	. . . . .	371 74
Miscellaneous items,	. . . . .	864 82
Total, automobile department,	. . . . .	222,277 93

EXAMINER'S DEPARTMENT EXPENSE.

Salaries of inspectors and examiners,	. . . . .	\$39,186 88
Salaries of clerks and stenographers,	. . . . .	7,851 76
Mileage books,	. . . . .	2,661 59
Traveling expenses,	. . . . .	23,042 53
Printing,	. . . . .	801 19
Postage, including stamped envelopes,	. . . . .	1,020 00
Office supplies,	. . . . .	873 12
Newspaper clippings,	. . . . .	132 00
Miscellaneous items,	. . . . .	5 20
Total, examiner's department,	. . . . .	75,574 27

SECOND-HAND DEPARTMENT EXPENSE.

Salaries of clerks and stenographers,	. . . . .	\$1,067 45
Printing,	. . . . .	1,711 65
Typewriters,	. . . . .	1,219 04
Office supplies,	. . . . .	429 75
Total, second-hand department,	. . . . .	4,427 89
Rebates of automobile fees,	. . . . .	36,051 50
Total, motor vehicle fees fund,	. . . . .	\$2,441,261 26

GENERAL EXPENSES, DEC. 1, 1918, TO NOV. 30, 1919.

[Under chapter 153, Special Acts of 1919.]

Salary of commissioners,	\$13,000 00
Travel of commissioners,	1,872 34
Salaries of clerical assistants and principal assistant engineers,	39,395 87
Printing and binding annual report,	1,405 95
Printing,	2,883 69
Postage,	1,553 90
Office and typewriter supplies,	1,790 00
Telephone, including tolls,	268 32
Land takings,	80 92
Advertising,	36 35
2 typewriters,	142 00
Repairs to typewriters,	117 00
Adding machine,	122 50
Rent for storage,	90 00
Miscellaneous items,	483 34
	—————
	\$63,242 18

Brightman Street bridge at Fall River:—

Pay rolls,	\$902 88
Salaries,	4,857 81
Electric service and lighting,	1,181 05
Telephone service,	38 40
Materials and repairs,	2,191 84
Miscellaneous items,	24 85
	—————
	9,196 83

Merrimac River bridge at Newburyport:—

Pay rolls,	\$141 77
Salaries,	3,048 59
Electric service and lighting,	262 59
Telephone service,	42 75
Materials and repairs,	1,793 38
Paint and painting,	5,633 45
Miscellaneous items,	35 64
	—————
	10,958 17

Machinery account:—

Rent, light, heat and fuel,	\$1,346 09
Salaries, labor and expense,	14,427 88
Freight and express,	1,114 97
Tools and apparatus,	1,248 09
Materials and repairs,	1,239 78
	—————

Amounts carried forward, \$19,376 81 \$83,397 18

<i>Amounts brought forward,</i>	\$19,376 81	\$83,397 18
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Machinery account — *Concluded.*

Supplies, parts and fittings,	12,481 63
Miscellaneous items,	559 55
Gasoline,	11,576 91
Tubes and tires,	2,875 59
Lubricants,	1,823 37
Garage and storage,	1,525 76
Repairs and parts,	12,433 37
Equipment,	10,998 09
Motor cycles,	308 85
Freight on trucks,	6,832 50
Miscellaneous (including registration of autos),	2,293 63
8 heating kettles,	1,207 00
3 automobiles,	1,234 88
1 steam-pressure scarifier,	900 00
2 Schramm compressors,	1,250 00
4 road machines,	782 00
1 prairie road drag,	30 00
1 road plow,	23 06
7 tents with flies,	196 00
1 imperial air hammer,	60 00
	—
	88,769 00
	—
	\$172,166 18

MISCELLANEOUS EXPENDITURES.

[Under Chapter 213, General Acts of 1916.]

Expenditures for the construction and maintenance of a State highway in the town of Hingham,	\$17,371 58
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[Under Chapter 230, General Acts of 1916.]

Expenditures in purchasing or taking by right of eminent domain land for the purpose of laying out and con- structing a highway in the city of Revere,	\$718 44
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[Under Chapter 203, General Acts of 1916, and Chapter 340, General Acts of 1919.]

Expenditures for the construction and improvement of the State highway known as the Black North Route, in Dracut and Methuen,	\$63 48
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[Under Chapter 236, General Acts of 1918 and Chapter 231, Special Acts of 1919.]

Leominster, road to Camp Devens,	\$268 67
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[Under Chapter 62, Resolves of 1919.]

Expenditures to determine the proper route for a State highway in the town of Williamstown, \$174 13

[Under Chapter 221, Acts of 1919.]

Expenditures for placing on main highways sign posts indicating the boundaries of cities and towns, \$23 87

[Under Chapter 232, Special Acts of 1919.]

Expenditures for the construction and improvement of the Holland Road, in the towns of Holland and Brimfield, \$2,511 07

[Under Chapter 233, Special Acts of 1919.]

Expenditures for the construction and improvement of a highway between the town of Holden and the Wachusett Mountain State Reservation, \$642 53

[Under Chapter 240, Special Acts of 1919.]

Expenditures for the reconstruction and improvement of a highway from Chester to Worthington through the town of Middlefield, \$2,847 00

[Under Chapter 336, General Acts of 1919.]

Expenditures for the construction and improvement of the highway from North Brookfield to New Braintree, \$1,427 20

[Under Chapter 337, General Acts of 1919.]

Expenditures for the construction and improvement of a highway from Gardner to Worcester, in the towns of Hubbardston and Rutland, \$270 78

[Under Chapter 338, General Acts of 1919.]

Expenditures for the construction of a highway in the city of Holyoke, \$390 28

[Under Chapter 339, General Acts of 1919.]

Expenditures for the construction and improvement of a highway leading from Milford to Southborough through the town of Hopkinton, \$83 60

[Under Chapter 348, General Acts of 1919.]

Expenditures for the construction of a State highway in the town of Norton from Main Street to the Easton town line, \$119 23

Expenditures under highway trust fund, \$10,119 03

SUMMARY OF EXPENDITURES.

For construction,	\$538,536	36
For construction under "small town" acts,	12,851	36
For western Massachusetts roadways under chapter 221, General Acts of 1915,	130,511	97
For road repair and maintenance from revenue,	292,524	64
For road construction under chapter 525, Acts of 1910,	322,662	25
For road construction under chapter 155, General Acts of 1918,	143,700	47
For road repair and maintenance (maintenance and im- provement of highways),	1,636,566	95
For expenditures connected with automobile registration,	222,277	93
For expense of examiners and investigators,	75,574	27
For expense of second-hand department,	4,427	89
For rebates of automobile fees under chapter 534, Acts of 1909,	36,051	50
For general office expense under chapter 153, Special Acts of 1919,	63,242	18
For expenditures under chapter 153, Special Acts of 1919 (bridges),	20,155	00
For expenditures under chapter 153, Special Acts of 1919 (care of road-building machinery),	88,769	00
For expenditures under chapter 213, General Acts of 1916, . .	17,371	58
For expenditures under chapter 230, General Acts of 1916, . .		718 44
For expenditures under chapter 203, General Acts of 1916, and chapter 340, General Acts of 1919,		63 48
For expenditures under chapter 236, General Acts of 1918, and chapter 231, Special Acts of 1919,		268 67
For expenditures under chapter 233, Special Acts of 1919, . .		642 53
For expenditures under chapter 240, Special Acts of 1919, . .		2,847 00
For expenditures under chapter 348, General Acts of 1919, . .		119 23
For expenditures under chapter 232, Special Acts of 1919, . .		2,511 07
For expenditures under chapter 337, General Acts of 1919, . .		270 78
For expenditures under chapter 336, General Acts of 1919, . .		1,427 20
For expenditures under chapter 338, General Acts of 1919, . .		390 28
For expenditures under chapter 339, General Acts of 1919, . .		83 60
For expenditures under chapter 62, Resolves of 1919,		174 13
For expenditures under chapter 221, Acts of 1919,		23 87
For expenditures under highway trust fund,		10,119 03
		<hr/>
		\$3,624,882 66

WM. D. SOHIER,
FRANK D. KEMP,
JAMES W. SYNAN,
Massachusetts Highway Commission

APPENDICES

APPENDIX A.

RELATING TO THE WORK OF THE AUTOMOBILE DEPARTMENT.

Statement showing the Number of Registration Certificates and Licenses to operate issued during the Fiscal Year 1919, also the Fees received for the Same, together with the Fees for Examinations, for Copies of Certificates of Registration and Licenses, etc., and Fines for Violation of the Automobile Law.

Certificates of registration:—

Automobiles (including 41,810 commercial vehicles),	247,182	\$2,125,269 50
Motorecycles,	13,698	26,169 00
Manufacturers and dealers,	2,496	75,898 00

Licenses to operate:—

Operators,	63,529 at \$2 00	127,058 00
Chauffeurs,	15,357 at 2 00	30,714 00
Operators' renewals,	161,389 at 1 00	161,389 00
Chauffeurs' renewals,	57,687 at 1 00	57,687 00
Examinations,	19,022 at 2 00	38,044 00
Copies of certificates and licenses furnished,	11,193 at 50	5,596 50
Number plates,		4,403 90

Total,		\$2,652,228 90
Court fines received by the Treasurer and Receiver-General,		104,924 94

Deduct rebate on registration fees,		\$2,757,153 84
		36,051 50
Miscellaneous receipts, including interest on deposits,		\$2,721,102 34
		15,624 95
Total receipts for the year,		\$2,736,727 29

REPORT OF THE EXAMINING AND INVESTIGATING DEPARTMENT.

To the Massachusetts Highway Commission.

GENTLEMEN:—I respectfully submit the following as the thirteenth annual report of the examining and investigating department for the fiscal year ending Nov. 30, 1919.

Examinations.

Examinations were conducted daily in Boston, weekly in Pittsfield, Springfield, Worcester, Fitchburg, Brockton, New Bedford, Fall River, Lowell and Salem, and alternate weeks in Greenfield and Hyannis. An examination was also held at Marthas Vineyard and Nantucket. Frequently examinations were conducted in other cities, where the applicants for licenses were municipal employees.

The following table is a comparison of the examinations conducted during the fiscal years 1918 and 1919:—

	1918.	1919.
Total number of examinations (chauffeurs),	17,203	18,882
Total number of examinations (operators),	185	225
Total number of examinations (chauffeurs reported unfit), . . .	3,386	3,499
Total number of examinations (operators reported unfit), . . .	61	66

The above figures show an increase of 1,719 in the number of examinations conducted and an increase of 118 in failures. Of the total number of examinations, 225 were given to applicants for operators' licenses. Sixty-six of these operators' examinations resulted in failure. The applicants who were examined for operators' licenses were required to pass an examination on account of some physical infirmity, or because the Commission had reason to doubt their ability to operate a motor vehicle.

Investigations and Prosecutions.

The following table is a comparison of the cases investigated and reports submitted during the fiscal years 1918 and 1919:—

	1918.	1919.
Total number of reports received from inspectors,	2,001	2,058
Itemized as follows:—		
Accidents (nonfatal),	293	307
Accidents (fatal),	491	532
Accidents (brief reports),	478	456
General reputation,	125	249
Miscellaneous,	255	296
Garages, dealers,	359	218
Totals,	2,001	2,058
Dazzling lights (reports filed),	288	444
Garages inspected,	1,505	159
Prosecutions (miscellaneous),	129	189
Prosecutions (dazzling lights),	244	342
Fines received (miscellaneous prosecutions),	\$3,456	\$4,810
Fines received (dazzling lights),	1,515	2,321
Totals,	\$4,971	\$7,131
Number sentenced to imprisonment,	6	3

During the year there were 547 fatal accidents, resulting in 591 deaths. Five hundred and thirty-nine of these accidents occurred in Massachusetts, resulting in 582 deaths. Eight accidents occurred in other States, resulting in 9 deaths. Six of these deaths occurred in Rhode Island, 2 in New Hampshire, and 1 in Connecticut. The fatal accidents that occurred in these States were investigated, for the reason that the operators were residents of Massachusetts, the accidents occurring within a reasonable distance of the dividing line. Of the 532 reports concerning fatal accidents submitted by the inspectors, 26 occurred during the fiscal year 1918.

Brief reports were filed on 456 accidents that were not considered serious enough to call to the attention of the Board. Many more accidents were inquired into that proved to be so trivial no reports were submitted.

During the year the inspectors investigated the status of ap-

proximately 2,800 dealers to ascertain if they were entitled to dealer's registration. Approximately 300 were not approved. Two hundred and eighteen reports were submitted, the majority alleging illegal registration or misuse of dealer's plates.

Inspections were made at 159 garages to ascertain if they were keeping a proper record book. Owing to the increase in other work it was found impossible to devote much time to this.

There was a great increase in work of a more or less miscellaneous nature, of which no record was kept, such as serving of suspension and revocation notices, securing of suspended or revoked licenses, and collecting money on checks returned by the banks as of no value. Much time was devoted by each inspector in identifying defendants prosecuted before the courts for serious offences. Abstracts of the court records in many cases were received bearing no addresses. Inspectors were instructed not only to ascertain the address of the defendant, but also his description, and whether or not he had been issued a license. The coming year it may be advisable to assign one or more men to court record work.

The plan of dividing the State into districts was continued, with the exception that the number was increased to 16 districts, these districts being grouped into seven divisions. An inspector was assigned to each district, with experienced men having the title of division inspectors, assigned to divisions, their work consisting of the investigation of accidents and complaints of a more or less difficult nature, with supervisory authority over district inspectors. This plan was only partially adopted, owing to an insufficient number of men. In sections of the State where it was adopted, successful results were obtained. Men with but slight experience soon became proficient under the direct supervision of experienced division inspectors.

The changes in the personnel of the inspectors of the department were as follows: Robert E. Bowman resigned April 7, 1919; Mark W. Murrill resigned July 5, 1919; William A. Dolan, Jr., resigned Aug. 11, 1919. Three new inspectors were appointed: Herbert L. Smith, Leslie H. Steele and Robert L. Devine.

The personnel of the department now consists of 1 chief inspector, 25 inspectors, 9 stenographers and 2 clerks, a total of 37.

Approximately 16,000 newspaper clippings were received, referring to accidents in which motor vehicles were involved. Many of these clippings concerned court prosecutions.

Letters received from operators who were involved in accidents numbered approximately 15,000.

Dazzling Lights.

A crusade against violators of the dazzling light regulation was started the week of May 19, continuing until the latter part of July. This work was carried on throughout the State. Complaints were brought before the courts against operators who had made no attempt to comply with the regulation. When motor vehicles were stopped because of dazzling lights, and it was found that the operators had attached some device, they were instructed to remedy the trouble. Of the cases prosecuted, difficulty was experienced in some courts in securing convictions. In comparing the work of this year with that of last, it appeared that although a great many motor vehicles were being operated with dazzling lights, more attempt was made to comply with the regulation by attaching some device.

Three hundred and forty-two operators were prosecuted, the courts imposing fines amounting to \$2,321. The inspectors filed 444 reports concerning dazzling lights.

As a result of the activity of our inspectors in this work, the police in numerous cities and towns detailed men to enforce the regulation. This applied especially to the city of Boston, where the police department did excellent work. Due appreciation should be extended to those police departments which, on request of our inspectors, assigned men to co-operate with them in this work. From comments made to our inspectors throughout the State, and from others who called at the office, all appeared anxious to comply with the regulation, their failure in most cases being due to lack of instruction as to proper focusing of lights.

Many headlights inspected, although equipped with some device, gave dazzling rays greater than those of other lights with no device. These cases were not prosecuted, as the attitude of most courts was to place on file a case of an offender who had made an attempt to comply with the regulation.

It has been suggested that the Commission adopt a standard maximum candle power, a candle power in excess of such a maximum to be *prima facie* evidence of dazzling light.

Second-hand Motor Vehicle Division.

This subdivision of the examining and investigating department was organized in accordance with the Acts of 1919, chapter 259, entitled "An Act to regulate the purchase and sale of

second-hand motor vehicles and parts thereof," which went into effect Sept. 26, 1919. The purpose of this act is to restrict and render increasingly difficult the sale or disposal of a motor vehicle after it is stolen.

Forms approved by the Commission were printed and distributed to the licensing officials of the various cities and towns. Temporary quarters were secured in Room 413, East Wing, State House, and stenographers and clerks employed. Great difficulty is being found in keeping records up to date, owing to insufficient office space. In complying with the act, it is planned to keep a card record of all motor vehicles registered in the Commonwealth, filed under engine number, the card showing continuity of ownership. It is expected that during the coming year approximately 200,000 of these cards will have been written and placed on file.

Daily and weekly reports of motor vehicles purchased or sold by licensed dealers, and notices of intent to sell sent to the Commission by individuals, after being recorded on the above-mentioned cards, are placed on file for ready reference. A special record is also kept of all motor vehicles reported to the Commission as having been stolen.

Notifications have been received from 109 cities and towns reporting that they have issued 813 licenses to dealers in second-hand motor vehicles.

Edward A. McGonagle, inspector, has been temporarily placed in charge of this subdivision, with 13 stenographers and clerks.

More space should be immediately secured, as it is estimated that it will be necessary to double the present force if the work of this division is to be of any aid in the recovery of motor vehicles that have been stolen.

Deaths, Injuries, Accidents.

The following tables are a comparison of the accidents in which motor vehicles were involved during the years 1918 and 1919, tabulated from newspaper clippings and letters received in accordance with the Acts of 1913, chapter 530, as amended by chapter 186, Acts of 1917: —

Number Killed and Injured.

	KILLED.		INJURED.	
	1918.	1919.	1918.	1919.
Pedestrians,	304	379	3,871	5,719
Occupants of automobiles,	136	160	3,560	8,712
Motorcycle riders,	28	25	504	677
Bicycle riders,	19	17	428	622
Occupants of carriages,	4	1	192	541
Street car passengers,	8	—	43	10
Totals,	499	582	8,598	16,281

Number of Accidents.

	1918.	1919.
Motor vehicles v. pedestrians,	4,860	6,189
Motor vehicles v. motor vehicles,	7,768	11,443
Motor vehicles v. carriages, etc.,	682	829
Motor vehicles v. bicycles,	647	712
Motor vehicles v. trolley cars,	753	918
Motor vehicles v. pole, curb, etc.,	1,126	1,169
Motor vehicles v. trains,	52	44
Totals,	15,888	21,304
Accidents in daytime,	12,289	17,366
Accidents after dark,	3,599	3,938
Accidents on country roads,	2,867	2,433
Accidents on city or town streets,	13,021	18,871

The above statistics are a summary of the deaths, injuries and accidents in which all types of motor vehicles were involved. On a basis of percentage, there was an increase of approximately 16 per cent in the number of persons killed, and nearly 90 per cent in the number injured, while the number of accidents increased 34 per cent. Approximately 81 per cent of these accidents occurred in the daytime.

The following tables show the number of deaths, injuries and accidents apportioned under separate headings:—

*Automobile and Truck Accidents.**Number Killed and Injured.*

	KILLED.		INJURED.	
	1918.	1919.	1918.	1919.
Pedestrians,	300	374	3,799	5,653
Occupants of automobiles,	136	160	3,538	8,694
Occupants of carriages,	4	1	190	537
Bicycle riders,	18	17	416	620
Street car passengers,	8	-	43	10
Totals,	466	552	7,986	15,514

Number of Accidents.

	1918.	1919.
Automobiles v. pedestrians,	4,778	6,119
Automobiles v. automobiles,	7,157	10,760
Automobiles v. carriages, etc.,	666	823
Automobiles v. bicycles,	630	710
Automobiles v. trolley cars,	743	915
Automobiles v. pole, curb, etc.,	1,088	1,148
Automobiles v. trains,	51	44
Totals,	15,113	20,519
Accidents in daytime,	11,696	16,726
Accidents after dark,	3,417	3,793
Accidents on country roads,	2,677	2,260
Accidents on city or town streets,	12,436	18,259

*Motorcycle Accidents.**Number Killed and Injured.*

	KILLED.		INJURED.	
	1918.	1919.	1918.	1919.
Pedestrians,	4	5	72	66
Motorcycle riders,	28	25	504	677
Occupants of automobiles,	-	-	22	18
Occupants of carriages,	-	-	2	4
Bicycle riders,	1	-	12	2
Totals,	33	30	612	767

*Motorcycle Accidents — Concluded.**Number of Accidents.*

	1918.	1919.
Motorcycles v. pedestrians,	82	70
Motorcycles v. motorcycles,	4	10
Motorcycles v. automobiles,	607	673
Motorcycles v. carriages, etc.,	16	6
Motorcycles v. bicycles,	17	2
Motorcycles v. trolley cars,	10	3
Motorcycles v. pole, curb, etc.,	38	21
Motorcycles v. trains,	1	-
Totals,	775	785
Accidents in daytime,	593	640
Accidents after dark,	182	145
Accidents on country roads,	190	173
Accidents on city or town streets,	585	612

Probation.

During the year 16 chauffeurs or operators were required to report at stated times to representatives of the Commission. All properly complied with their terms.

Comparison of Analysis of Abstracts of Court Records for the Fiscal Years 1918 and 1919.

	1918.	1919.
Number of courts that have forwarded abstracts,	89	91
Total number of abstracts received,	12,652	14,212
Persons guilty of operating unlawfully,	10,637	12,372
Persons not guilty of operating unlawfully,	404	492
Cases appealed to a higher court,	756	825
Complaints placed on file,	3,386	3,926
Complaints nol-prossed,	825	344
Probation,	244	201
Defendants defaulted,	49	14
Persons committed to imprisonment,	291	439

*Comparison of Analysis of Abstracts of Court Records for the Fiscal Years
1918 and 1919 — Concluded.*

	1918.	1919.
Complaints brought: —		
For overspeeding,	3,743	4,195
For reckless operating,	257	194
For operating while intoxicated,	796	788
For using automobile without authority,	326	286
For endangering lives and safety of the public,	271	357
For failing to stop after causing injury,	133	139
For operating without a license,	1,416	1,657
For operating without carrying registration certificate,	473	667
For operating an unregistered motor vehicle,	260	323
For improper display or no register number,	300	354
For refusing to stop when signaled by officer,	251	336
For operating with unlighted lamps,	1,259	1,682
For failing to give signal when approaching intersecting way,	1,734	1,283
For operating with dazzling lights,	386	658
For operating within 8 feet of street car,	272	300
For violating metropolitan park rules,	-1	236
For miscellaneous offences,	906	1,141
For operating after license suspended or revoked,	-1	36
For larceny of motor vehicles,	-1	339
For manslaughter,	-1	32

Fines, etc., as shown by Court Abstracts.

	1918.	1919.
For violating State statutes,	\$114,098 00	\$124,126 00
For violating metropolitan park rules,	-1	1,626 00
For cost of court,	3,533 92	3,309 31
Totals,	\$117,651 92	\$129,061 31

¹ No record in 1918.

Respectfully submitted,

F. L. AUSTIN,
Chief Inspector.

Nov. 30, 1919.

APPENDIX B.

RELATING TO THE CARE OF SHADE TREES ON STATE HIGHWAYS.

Lists of Towns and Cities in which Work has been done by the State Forester's Department in cleaning and spraying Trees on State Highways for suppressing Gypsy and Brown-tail Moths and Elm-leaf Beetles, and the Amount expended in Each Municipality.

Acton,	\$13 50	Grafton,	\$69 75
Amesbury,	44 37	Groveland,	47 88
Andover,	114 50	Hamilton,	111 08
Ashburnham,	112 00	Hanover,	25 00
Ashland,	69 05	Harwich,	37 10
Attleboro,	49 80	Haverhill,	115 39
Barnstable,	112 30	Hingham,	80 70
Bedford,	70 09	Holbrook,	44 80
Bellingham,	24 56	Holliston,	12 50
Beverly,	137 54	Ipswich,	38 40
Billerica,	91 88	Lakeville,	40 00
Bourne,	44 28	Lancaster,	4 00
Boxborough,	16 00	Lawrence,	17 46
Braintree,	88 75	Leominster,	43 82
Brewster,	49 78	Lexington,	111 63
Bridgewater,	49 20	Lowell,	74 15
Burlington,	103 20	Lunenburg,	97 50
Chatham,	19 25	Mansfield,	49 40
Chelmsford,	169 31	Marshfield,	32 10
Cohasset,	124 52	Mashpee,	109 50
Concord,	29 96	Melrose,	55 00
Dedham,	48 30	Merrimac,	50 32
Dennis,	59 90	Methuen,	84 10
Dighton,	161 00	Milton,	10 00
Dover,	146 90	Newbury,	59 86
Dracut,	111 74	Newburyport,	38 87
Essex,	24 63	North Andover,	189 58
Falmouth,	66 75	North Attleborough,	102 60
Fitchburg,	92 07	North Reading,	42 90
Framingham,	32 00	Northborough,	128 20
Franklin,	61 80	Norton,	149 00
Gloucester,	59 86	Norwood,	117 00

Orleans,	\$26 60	Uxbridge,	\$41 29
Pembroke,	41 50	Walpole,	135 60
Plainville,	39 80	Wareham,	29 25
Quincy,	12 00	Wayland,	21 00
Randolph,	92 64	Wellfleet,	29 48
Raynham,	43 40	Wenham,	109 81
Reading,	131 07	West Boylston,	33 70
Rehoboth,	149 00	West Bridgewater,	26 38
Rockport,	27 14	West Newbury,	88 56
Rowley,	85 64	Westborough,	38 26
Salisbury,	99 49	Westfield,	97 75
Sandwich,	14 00	Westford,	132 10
Scituate,	77 33	Westminster,	87 61
Seekonk,	49 80	Weston,	13 00
Shrewsbury,	82 87	Weymouth,	169 45
Somerset,	191 00	Wilmington,	58 65
Southborough,	84 20	Winchendon,	29 50
Sterling,	65 00	Winchester,	68 35
Stoneham,	99 32	Woburn,	263 63
Stoughton,	111 20	Wrentham,	120 00
Swansea,	198 40	Wrentham and Fox- borough,	198 40
Taunton,	61 40	Yarmouth,	176 11
Templeton,	16 89		
Tewksbury,	114 25		
Truro,	121 40		
Tyngsborough,	156 00		\$8,747 60

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, AND
CONSTRUCTION EXPENDITURES, TO DEC. 1, 1919.

TOWN OR CITY.	Year.	ROADS LAID OUT.			Length (Miles).	Length con- structed (Miles).	Construction Ex- penditures to Dec. 1, 1919.
		From —	Direction.	Length (Miles).			
Abington,	1900-1-3,	Brockton line,	Easterly,	1.729	1.729		
Abington,	1905-7,	Holbrook line,	Easterly,	1.639	1.639		
Abington,	1911,	Weymouth line,	Southerly,	.955	.955	\$57,403 75	
Abington,	1913,	North Abington,	Southwesterly,	1.080	1.080		
Abington,	1915,	Whitman line to Maple Street,	Northwesterly,	.537	.537		
Aetow,	1899-1000-1-2,	Concord line to Littleton line,	Northwesterly,	3.711	3.711		
Aetow (Harvard Pike),	1901-7-12-13,	Boxborough line to Concord line,	Easterly,	3.967	3.967		
Aetow,	1919,	Connection at railroad crossing,	—	—	.188	.188	
Aeuchinet,	1901-3,	Rochester line to Rochester line via Long Plain,	Westerly and northerly,	2.797	2.797		
Aeuchinet,	1897,	New Bedford line,	Northerly,	.599	.599		
Acushnet,	1917,	Fairhaven line,	Northerly,	1.207	1.207		
Acushnet,	1897,	Chester line (Maple Grove),	Northerly,	.669	.669		
Adams,	1908,	Cheshire line (Orchard Street),	Southerly,	1.459	1.459		
Adams,	1903-4-6-9-11,	Southend Bridge to Connecticut line,	—	3.993	3.993		
Agawam,	1899-1901-3-4,	Merrimac line,	Easterly,	2.243	2.243		
Amesbury,	1906-7-12,	Salisbury line,	Westerly,	1.052	1.052		
Amherst,	1901-4,	Hadley line,	Northwesterly,	.971	.971		
Amherst,	1913,	Sunderland line,	Southwesterly,	.796	.796		
Amherst,	1915,	South Hadley line,	Northerly,	2.296	2.296		
Amherst,	1919,	End of 1913 section,	Southerly,	.485	.485		
Amherst,	1919,	Boston & Maine railroad bridge to 1915 section,	—	—	—	55,076 91	
Andover,	1895-6,	Lawrence line,	Southerly,	2.508	2.508		
Andover,	1897-9-1900-2-3,	Noth Reading line,	Northerly,	1.206	1.206		
				2.983	2.983		

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC. — *Continued.*

TOWN OR CITY.	Year.	ROADS LAID OUT.		Length constructed (Miles).	Construction Ex- penditures to Dec. 1, 1919.
		From —	Direction.		
Arlington,	1916,	Lexington line,	Southeastly,	1.297	\$30,249 41
Ashburnham,	1911,	New Hampshire State line,	Southeastly,	672	23,212 78
Ashburnham,	1916,	Winchendon line to Winchendon line, ¹	{ Southeastly, Northeastly,	1,699 } 3,776 }	J.475
Ashby,	1894-5-6-7-8-9,	Townsend line,	{ Northeastly, Northerly,	3,571	102,255 37
Ashby,	1910-11-12,	Ashburnham line,	Southwesterly,	1,526	
Ashby,	1917,	One mile north of Ashfield post office,	Easterly,	1,826	
Ashfield,	1897-8,	Southborough line,	Northerly,	1,608	35,282 05
Ashland,	1903,	Framingham line,	Easterly,	1,473	
Ashland,	1910,	Orange line,	Southerly,	1,725	13,822 90
Athol,	1895-6,	Phillipston line,	Easterly,	1,607	
Athol,	1902-3,	Petersham line,	Northwesterly,	1,496	95,377 33
Athol,	1919,	North Athleborough line to Rhode Island line,	Northerly,	2,479	
Attleboro,	1900-1-2,	Norton line,	Southwesterly,	2,651	2,651
Attleboro,	1909,	Worcester line to Oxford line,	Northwesterly,	738	738
Auburn,	1895-7-8-9-1901-3-4,	Brockton line to Avon Square,	Southwesterly,	5,299	70,192 25
Avon,	1914,	Littleton line to Littleton line,	Northerly,	1,310	11,896 81
Ayer,	1912,	Shirley line,	Southeasterly,	127	127
Ayer,	1913-14,	Littleton line,	Southeasterly,	1,498	1,498
Ayer,	1916,	Mashpee line,	Northwesterly,	1,853	853
Barnstable (North),	1909,	Yarmouth line,	Westerly,	1,912	1,912
Barnstable (North),	1899-1902-7-10-11,	Sandwich line,	Easterly,	5,490	5,490
Barnstable (South),	1918,	End of 1916 layout,	Easterly,	.553	.553
Barnstable (West),	1897-1901,	Yarmouth line,	Westerly,	2,263	2,263
Barnstable (West),	1904-05-07,	Mashpee line,	Easterly,	3,870	3,870
Barnstable (West),	1916,	Mashpee line,	Easterly,	2,265	2,265
Barnstable,	1918,	Easternly end of 1905 layout,	Easterly,	2,184	1,748
Barnstable,	1919,	Connecting 1901 and 1918 sections,	—	3,301	1,000
Barre,	1897-9,	Ware River to Barre Common,	—	2,891	2,891
Barre,	1919,	Petersham line,	—	3,171	3,171
Becket,	1902-4-5-6-8-10-12-13,	Chester line to Lee line,	Westerly,	10,812	10,812
Bedford,	1916,	Washington line to Bonney Rigg,	Southeasterly,	6,906	6,906
Bedford,	1897-1902,	Lexington,	Northwesterly,	1,079	1,079
Bedford,	1903-6,	Carlisle Bridge,	Southeasterly,	.569	.569
					22,145 82

Belchertown,	1900-1-2-7-8-14,	Near depot to Granby line,	3.228	32,802 94
Bellingham,	1902-5-6,	Blackstone,	3.225	32,802 94
Bellingham,	1904-5-6,	Franklin line to Mendon line,	.553	22,866 35
Berkley,	1906-13,	Lakeville line to Taunton line,	2.627	22,866 35
Bernardston,	1911,	Fall River to Gill line,	1.258	11,392 50
Bernardston,	1915-18,	Vermont line to Greenfield line,	2.702	27,466 15
Beverly,	1895-7-8,	Wentham line,	6.075	6.075
Beverly,	1905-6,	Manchester line,	2.010	2.010
Billerica,	1908-17,	Near "Common" to Burlington,	3.671	34,165 31
Billerica,	1916,	Chelmsford line,	3.462	34,165 31
Blackstone,	1899-1900-2-9,	Millville line to Woonsocket line,	1.894	97,170 68
Blackstone,	1905,	Bellingham line to Woosocket line,	2.044	2.044
Blandford,	1918,	Russell line to Village,	.055	.055
Boston,	1908,	Bedham line to Lagrange Street,	4.133	4.133
Bourne,	1897-8-1904-14-15,	Cohasset Narrows to Canal Bridge,	1.396	1.396
Bourne,	1903-5-7-10-11,	Back River Bridge,	5.556	133,992 53
Bourne,	1913-14-15,	Plymouth line to Canal Bridge,	5.281	5.281
Bourne,	1897-9-1905-7,	Action line to Harvard line,	2.027	2.027
Borborough,	1900-2,	Quincy line to Fore River,	3.311	20,518 34
Braintree,	1915,	Holbrook line,	1.060	1.060
Braintree,	1917,	South Braintree,	1.416	1.416
Braintree,	1919,	Quincy line,	1.056	88,228 20
Braintree,	1919,	1902 section,	2.420	2.420
Braintree,	1895-6-7-1901,	Dennis line to Orleans line,	.021	.021
Brewster,	1908,	Orelands line to Chatham line,	7.786	7.786
Brewster,	1916,	East Bridgewater line,	.035	.035
Bridgewater,	1904-5-6-7-8,	Taunton River,	1.075	30,307 58
Brimfield,	1897-9,	Monson line,	3.485	3.485
Brimfield,	1901-2,	Waless line,	2.338	2.338
Brockton,	1897-8-9,	Eastern line,	1.629	25,053 43
Brockton,	1900,	Abington line,	1.867	1.867
Brockton,	1904,	West Bridgewater line,	.657	.657
Brockton,	1914,	Stoughton line,	.662	.662
Brookfield,	1897-8-1900-2-3-4,	West Brookfield line to Brookfield Village,	.604	.604
Brookfield,	1905-7,	Spencer line,	3.018	3.018
Brookfield,	1912,	North Brookfield line to railroad,	.871	54,608 62
Buckland,	1894-5-6-7-8-9-1900-3-7,	Shelburne Falls station,	.744	.744
Buckland,	1913,	Scott's Bridge,	4.280	4.280
Burlington,	1903-4-5-6,	Woburn line to Billerica line,	.025	67,043 07
Charlenton,	1905-6-7-8,	Stoughton,	.799	34,809 50
Charlenton,	1897-8-1912-13-15,	Deerfield River Bridge to Scott's Bridge,	3.232	25,555 28
Charlenton,	1914,	Savoy line to railroad,	9.251	9.251
			2.671	2.671

1 Exclusive of Winchendon Village.

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC.—Continued.

TOWN OR CITY.	YEAR.	ROADS LAID OUT.		Length constructed (Miles).	Construction Ex- penditures to Dec. 1, 1919.
		From —	Direction.		
Charlton,	1901-2,	Charlton Depot to Charlton City,	Southerly,	1.913	1.913
Charlton,	1905-6-7-10-11-12,	Oxford line to Charlton City,	Southwesterly,	4.839	4.839
Charlton,	1909-13-14-15,	Southwesterly line to Charlton City,	Westerly,	3.078	3.078
Charlton,	1919,	Connecting 1905 and 1909 sections,	—	.546	.546
Chatham,	1899-1901-2-5-6,	Depot Street to Harwich line,	Westerly,	4.038	4.038
Chatham,	1907,	Depot Street to Harwich line,	Northwesterly,	3.128	3.128
Chelmsford,	1898-1901-7-10,	Lowell line to Tyngsborough line,	Westerly and northerly,	2.433	2.433
Chelmsford,	1903-4,	Lowell line towards Chelmsford Center,	Southwesterly,	1.262	1.262
Chelmsford,	1908-11,	Westwood line,	Northeasterly,	2.512	96,477 02
Chelmsford,	1915,	Lowell line to Billerica line,	Southerly,	.981	.981
Chester,	1901-4,	Lewis Street to Eastern Avenue,	Southwesterly,	.950	25,382 66
Cheshire,	1899-1900-1-2-10-13-14,	Lanesborough line to Adams line,	Northeasterly,	6.670	103,350 83
Chester,	1899-1900-1-2-4-5-9-10-11,	Becket line to Huntington line,	Southeastery,	6.616	74,428 00
Chicopee,	1897-9,	Springfield line,	Northerly,	.918	.918
Chicopee,	1902-3-4-5-6-7-17,	Williamett Bridge,	Southerly,	3.036	3,036
Chilmark,	1905-6-8-9-11-13,	West Tisbury line to Gay Head line,	Southwesterly,	7.789	54,138 18
Clarksburg,	1903-7-9-16-18,	North Adams line via Red Mill to Vermont line,	Northeasterly and northerly,	2.754	2.754
Clarksburg,	1913,	Mountain Road,	—	21,772 03	21,772 03
Cohasset,	1897-8-1900,	New Hingham line,	Easterly,	—	—
Cohasset,	1902-3,	Beechwood to Sequitue line,	Southerly,	.122	.122
Colrain,	1898-1901-5,	Shelburne line,	Northerly,	1.733	16,541 20
Concord,	1897-8,	Lincoln line,	Northwesterly,	.547	.547
Concord,	1900-5-6,	Acton line, Great Road,	Southeastery,	2.133	13,443 20
Concord,	1913,	Acton line, Harvard Turnpike,	Southeasterly,	1.462	1.462
Conway,	1918,	Deerfield line,	Westerly,	2.128	2.128
Cummington,	1919,	Cummington Village,	Easterly and westerly,	.600	.600
Dalton,	1895-6-1903-4,	Pittsfield line,	—	3.074	3.074
Dalton,	1919,	Windsor line,	Southwesterly,	4.685	69 21
Danvers,	1915,	Ipswich River Bridge on Andover Street,	Southeastery,	2.557	36,324 38
Danvers,	1919,	Land of 1915 sections,	Southeasterly,	.314	.314
Dartmouth,	1898-9-1900-1-3-5-13,	New Bedford line to Westport line,	Westerly,	.691	.691
Dedham,	1913-1915,	Boston line,	Southerly,	1.288	1.288
Dedham,	1914,	Westwood line,	Northeasterly,	4.735	50,723 78
Dedham,	1914,	Bridge over Charles River;	Southerly,	.028	38,475 87
				1.062	1.062
				1.264	1.264

Deerfield,	1894-5,	South Deerfield to Sunderland Bridge,	Southeasterly,	1.533
Deerfield,	1900-1-2-3,	Cheapside Bridge, Deerfield River,	Southerly,	1.446
Deerfield,	1900-5-6-7-8-9-10-11-13,	Whately line to Deerfield Village,	Northerly,	4.860
Deerfield,	1917,	South Deerfield and Conway line,	Northwesterly,	3.234
Dennis (North),	1895-6-7-8,	Yarmouth line to Brockton line,	Northeastery,	4.264
Dennis (South),	1900-1-2-4-6,	Base River to Harwich line,	Easterly,	3.234
Dighton (North),	1902,	Taunton line to Rehoboth line,	Easterly,	3.234
Dighton (South),	1905-6-8-9-10-11-12-14,	Taunton line to near Somerset line,	Southeasterly to southerly,	1.563
Douglas,	1902-4,	Sutton line to Manchaug,	Southeasterly,	4.544
Dover,	1905,	Main Street,	Southeasterly,	1.591
Draeut,	1905-6-7,	Charles River,	Westerly,	1.534
Draeut,	1912,	Near Lowell line on Methuen Road,	Northwesterly,	2.181
Draeut,	1919,	Lowelline, River Road to Methuen line,	Northeasterly,	1.828
Dudley,	1902-4-6-7-16,	End of 1907 section,	Northeasterly,	3.262
Duxbury,	1894-5-7-9-1903-5-8-9,	Near Webster line to Connecticut,	Northeasterly,	6.613
Duxbury,	1914-15,	Mansfield line to Kingston line,	Southerly,	3.186
Eastham,	1903-4-5-6-9,	Pembroke line to Kingston,	Southeasterly,	5.159
Easthampton,	1895-6,	Wellfleet line to Orleans line,	Southerly,	3.758
Easthampton,	1900-1,	Northampton line,	Southwesterly,	6.460
Easthampton,	1913,	Mount Tom at Clark Street,	Northerly,	1.285
Easthampton,	1918,	Holyoke line to Northampton line,	Northwesterly,	1.093
East Bridgewater,	1904-6-10,	Whitman line to Bridgewater line,	Southerly,	3.355
East Longmeadow,	1900,	Springfield line to village,	Southeasterly,	3.766
Edgartown,	1897-9-1900,	Brockton line,	Southwesterly,	1.799
Egremont,	1915,	Oak Bluffs line,	Southerly,	1.799
Egremont,	1917,	New York line,	Southeasterly,	2.458
Erving,	{ 1898-9-1900-7-9,	Sheffield line,	Northerly,	2.236
Essex,	{ 1910-11-13-14,	Orange line to Millers Falls,	Northwesterly,	2.060
Essex,	1912,	Essex River,	Easterly and westerly,	8.123
Fairhaven,	1894-5-1916,	Gloucester line,	Westerly,	3.347
Fairhaven,	1915,	Mattapoisett line,	Westerly,	1.110
Fall River,	1904,	Acushnet line,	Southerly,	2.093
Falmouth,	1905-6-7-8-9-10,	Britman Street Bridge approach,	Southerly,	2.033
Falmouth,	1894-5,	Bourne line to Woods Hole,	Southerly,	1.634
Fitchburg,	1897,	East Falmouth to Waquoit,	Easterly,	0.43
Fitchburg,	1913,	Westminster line,	Easterly,	11.615
Florida,	1914,	Lunenburg line,	Westerly,	3.912
Foxborough,	1901-2,	Ashby line,	Southerly,	.973
Foxborough,	1905-8,	Savoy line,	Easterly,	.605
		North Adams line,	Southeasterly,	2.540
		Mansfield line,	Northerly,	.030
		Wrentham line,	Southeasterly,	7.205
				134,722 06
				1.815
				19,537 03
				1.699

HIGHWAY COMMISSION.

[Pub. Doc.]

Showing THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC. — *Continued.*

TOWN OR CITY.	Year.	ROADS LAID OUT			Length constructed (Miles).	Construction Expenditures to Dec. 1, 1919.
		From —	Direction.	Length (Miles).		
Framingham,	1904-5,	Southboro line, Pleasant Street,	Southeastly,	2.432	2.432	\$17,335 26
	1910,	Ashland line, Hollis Street,	Easterly,	.2.773	.773	
Franklin,	1905-7-10,	Bellingham line,	Northerly,	.2.579	2.579	29,713 89
Franklin,	1911,	Wrentham line,	Northwesterly,	1.184	1.184	
Freetown,	1902-3,	New Bedford line to Lakeville line,	Northerly,	3.193	3.193	18,555 16
Gardner,	1908,	Fall River line to Assonet,	Northeasterly,	.676	.676	
Gardner,	1897-8,	Temple Street line,	Easterly,	2.371	2.371	44,906 82
Gardner,	1900-1,	Westminster,	Northwesterly,	3.985	3.985	
Gay Head,	1913,	Chilmark line,	Northwesterly,	3.134	3.134	9,702 98
Gill,	1912,	Bernardston line to Northfield line,	Easterly,	.284	.284	4,322 20
Gloucester,	1894-5-8-1905-6-7,	Manchester line to "Cut Bridge,"	Northerly,	3.464	3.464	
Gloucester,	1907,	Rockport line,	Southwesterly,	.524	.524	141,829 77
Gloucester,	1915-16,	Essex line,	Easterly,	2.762	2.762	
Goshen,	1894-5-8,	Williamsburg line,	Northwesterly,	2.460	2.460	46,440 20
Crafton,	1897-9-1903-5-12-13-14-15,	Milbury line to Northbridge line,	Southerly,	6.510	6.510	
Granby,	1908,	Upton line to Grafton Village,	Northwesterly,	3.068	3.068	92,568 39
Granby,	1894-1902-5-6-8,	South Hadley line,	Easterly,	2.260	2.260	
Granby,	1911-12-14,	North Street and Belchertown,	East and southeasterly,	2.260	2.260	
Granby,	1915,	South Hadley line to Amherst line,	Northeasterly,	3.203	3.203	87,008 09
Great Barrington,	1919,	Connecting 1908 section,	—	2.034	2.034	
Great Barrington,	1894-6-7-1902,	Housatonic River Bridge,	Easterly,	.189	.189	
Great Barrington,	1910-17,	Stockbridge line,	Southerly,	3.409	3.409	
Great Barrington,	1919,	Sheffield line,	Northerly,	2.289	2.289	141,108 14
Great Barrington,	1919,	End of 1917 section,	Southerly,	2.096	2.096	
Greenfield,	1899-1900-2,	Washington Street,	Easterly,	.900	.900	
Greenfield,	1903-6-7-8-10-14,	Bernardston line,	Southwesterly,	1.421	1.421	
Greenfield,	1905,	Point on Colrain road,	Northerly,	3.768	3.768	51,454 67
Greenfield,	1919,	Shelburne line,	Southeasterly,	.262	.262	
Groton,	1901-2-7,	Pepperell line,	Southeasterly,	2.337	2.337	
Groton,	1894-1904,	Pepperell line,	Southwesterly,	1.410	1.410	26,667 36
Groveland,	1900-1-2-5,	Merrimac River Bridge to West Newbury line,	Northeasterly,	.105	.105	
Hedley,	1894-1904,	Connecticut River to Amherst line,	Easterly,	1.723	1.723	22,613 35
Hamilton,	1899-1900-16,	Ipswich line,	Southwesterly,	4.690	4.690	73,541 83
Hamilton,	1909-10,	Wenham line,	Northeasterly,	1.881	1.881	36,438 40
				1.221	1.221	

Hancock,	Pittsfield line to New York State line,	Westerly,	51,991 28
Hanover,	Bour Corners,	Westerly,	3,232
Hanover,	Fembroke line to Norwell line,	Northwesterly,	1,285
Hardwick,	New Braintree line,	Northwesterly,	85,517 37
Harvard,	Boxborough line to Harvard Common,	Northwesterly,	4,411
Harvard,	Dennis line to Chatham line,	Westerly,	.819
Harwich,	Chatham line to Brewster line,	Easterly,	6,344 68
Harwich,	Northampton line to Whately,	Northerly,	2,316
Hatfield,	Kenoza Road to Merrimac line,	Northwesterly,	5,098
Hatfield,	River and Maxwell streets to Methuen line,	Northerly,	1,379
Haverhill,	North Andover line,	Northwesterly,	3,540
Haverhill,	Weymouth Back River,	Easterly,	2,657
Haverhill,	Cohasset line,	Westerly,	2,629
Hingham,	Point on State highway,	Easterly,	33,756 03
Hingham,	Weymouth line to Norwell line,	Southeastery,	1,420
Hinsdale,	Dalton line,	Southeastery,	1,286
Holbrook,	Brantree line,	Northwesterly,	1,228
Holbrook,	Worcester line to Rutland line,	Northwesterly,	1,223
Holden,	Upton line to Milford line,	Easterly,	1,242
Hopkede,	Milford line,	Northeasterly,	-
Holliston,	Ashland line,	Southerly,	1,017
Holliston,	Easthampton line,	Northwesterly,	13,495 68
Holyoke,	Brigham Street to Marlborough line,	Southerly,	1,739
Hudson,	Russell line,	Southwesterly,	823
Huntington,	Worthington line,	Northwesterly,	823
Huntington,	Chester line,	Easterly,	6,949
Huntington,	Hamilton line to Ipswich Common,	Northeasterly,	316
Ipswich,	Bowley line,	Southerly,	3,314
Ipswich,	Duxbury line,	Southwesterly,	1,610
Kingston,	Duxbury line,	Southerly,	4,167
Kingston,	Plymouth line,	Westerly,	1,142
Kingston,	New Middleborough Avenue,	Southerly,	1,009
Lakeville,	Freetown line to Berkley line,	Northwesterly,	5,366
Lakeville,	Clinton line to Sterling,	Northerly,	1,640
Laneaster,	Cheshire line to Pittsfield line,	Southwesterly,	2,134
Lanesborough,	Pratt Brook,	Northerly,	2,287
Lanesborough,	Methuen line,	Northwesterly,	1,016
Lawrence,	Southbridge line to Becket line,	Southwesterly,	.811
Lee,	Lenox line to Lee Village,	Easterly and northeasterly,	.712
Lee,	Lenox line to Southbridge line,	Southerly,	3,570
Leicester,	Worcester line to Spencer line, ¹	Westerly,	56,045 43

1 Exclusive of Leicester Village.

HIGHWAY COMMISSION.

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SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC. — *Continued.*

TOWN OR CITY.	Year.	ROADS LAID OUT.		Direction.	Length (Miles).	Length con- structed (Miles).	Construction Ex- penditures to Dec. 1, 1919.
		From —	To —				
Lenox,	1899-1900-1,	Lee line to Lenox line (Walker Street), Pittsfield line to Lenox Village,	Northerly, Southerly,	2.282	2.282	\$39,163 36	
Lenox,	1904-5,	Lenox Village (Kimball Street),	Northerly,	3.181	3.181		
Leominster,	1901-2-15,	Sterling line,	Westerly,	2.200	2.200		
Lexington,	1895-6-7-8,	Massachusetts Avenue,	Southeastery,	2.549	2.549	31,192 99	
Lexington,	1900,	Bedford line,	Northwesterly,	3.446	3.446		
Lexington,	1916,	Arlington line,	Westerly,	.845	.845	48,740 76	
Lexington,	1919,	End of 1916 section,	Northwesterly,	.333	.333		
Lincoln,	1895-6-7,	Lexington line to Concord line,	Northwesterly,	.383	.383		
Littleton,	1902-3-4,	Acton line, Great Road,	Northwesterly and westerly,	2.060	2.060	17,392 38	
Littleton,	1902,	Westford line to Great Road,	Southwesterly,	4.010	4.010		
Littleton,	1912-13,	Ayer line,	Southeasterly,	.337	.337	37,961 36	
Lowell (boulevard),	1897-8,	Tynessborough line,	Easterly,	1.632	1.632		
Lowell (Princeton Street),	1900,	Chelmsford line,	Easterly,	.969	.969		
Lunenburg,	1898-9-1900-1-3-10-13,	Tewksbury line, Fitchburg line to Shirley line,	Northwesterly, Easterly and Southeasterly,	1.334	1.334	22,036 82	
Lynn,	1898,	Saugus River to Sea Street,	Northeasterly,	.351	.351		
Lynn,	1916,	Salem line to Floating Bridge,	Southeasterly,	5.886	5.886	64,195 46	
Lynn,	1914,	Lynnfield line,	Southeasterly,	.905	.905		
Lynn,	1917,	Fox Hill Bridge,	Southeasterly,	.369	.369	193,363 68	
Irvinefield,	1914,	Lynn line,	Southerly,	1.985	1.985		
Maiden,	1918,	Melrose line,	Westerly,	.403	.403		
Mansfield,	1901,	Foxborough line,	Southwesterly,	.031	.031		
Mansfield,	1906,	Norton line,	Southeasterly,	.151	.151	6,304 93	
Marlborough,	1894-5-11,	Marion Village to Wareham line,	Northerly,	.720	.720		
Marion,	1897-9-1901-2,	Marion Village to Mattapoisett line,	Northeasterly,	.493	.493	10,068 19	
Marion,	1903,	Marion Village to Rochester line,	Westerly,	1.594	1.594		
Marion,	1914,	Northerly end of 1917 section,	Northwesterly,	1.840	1.840		
Marlborough (East),	1897-1902-3-4,	Sudbury line to Hosmer line,	Northerly,	2.120	2.120	38,557 65	
Marlborough (West),	1897-9-1900-1-16,	Northborough line,	Westerly,	1.045	1.050		
Marlborough,	1898-11,	Hudson line,	Southerly,	3.114	3.114	86,318 51	
Marshfield,	1894-1910,	Duxbury line to North River Bridge,	Southerly and southwesterly,	2.590	2.590		
Mashpee,	1911-12-13-14,	Falmouth line to Barnstable line,	Northwesterly,	1.278	1.278	54,626 51	
Mashpee,	1916,	Barnstable line (Cotuit Road),	Westerly,	5.724	5.724	70,177 72	
				2.080	2.080		

Mattapoisett,	1894-5,	Fairhaven line,	Easterly,	1.162	24,528 57
Mattapoisett,	1900-1-3,	Marion line,	Westerly,	2.044	2,044
Medford,	1907,	Somerville line via M'ystic Avenue,	Northwesterly,	.862	30,974 24
Melrose,	1906,	Saugus line, Upham Street,	Westerly,	.395	395
Melrose,	1917,	Malden line to Saugus line,	Northwesterly,	.173	12,230 89
Mendon,	1918,	Hopedale line,	Southwesterly,	.928	-
Merrimac,	1897-8-9-1910,	Haverhill line,	Easterly,	1.025	1.025
Merrimac,	1901-3,	Amberry line,	Southwesterly,	1.206	23,486 74
Methuen,	1896-1908,	Lawrence line to Haverhill Street,	Northwesterly,	3.688	3,688
Methuen,	1912-15-16-17,	Draut line to Lawrence line,	Northeasterly,	4.109	153,940 98
Middleborough,	1894-1903,	Neasket River to Rochester line,	Southwesterly,	8.978	8.978
Middleborough,	1906-7-8,	Bridgewater line to railroad bridge,	Southwesterly,	3.465	3,465
Middleton,	1912-13-14,	North Andover line,	Southwesterly,	2.655	2,655
Milford,	1904-5,	Hopedale line via West Street,	Southwesterly,	1.745	1.745
Milford,	1909-10,	Holliston line,	Southwesterly,	1.801	1.801
Millbury,	1902,	Worcester line to Grafton line,	Southwesterly,	.782	.782
Millbury,	1906-3-4,	Worcester line to Main Street,	Southwesterly,	1.612	1.612
Millbury,	1906,	Sutton line,	Northwesterly,	.587	.587
Millville,	1899-1900-2-9,	Uxbridge line to Blackstone line,	Southwesterly,	1.630	1.630
Milton,	1899-1900-17,	Newport River to Granite Bridge,	Southwesterly,	1.057	1.057
Monson,	1894,	Railroad bridge toward Palmer,	Northwesterly,	.934	.934
Monson,	1901-5,	Palmer line to Brimfield line,	Northwesterly,	.394	16,302 49
Monson,	1908,	Third Street near L Street, Turners Falls,	Easterly and westerly,	.287	.287
Montague,	1898-9-1904-6-10,	Connecticut River Bridge,	Easterly,	4.052	4.052
Montague,	1905-6-7-8,	First milestone, Siasconset,	Northwesterly,	1.678	52,267 21
Nantucket,	1894-1903,	Wellesley line to Lincoln Square,	Easterly,	1.678	-
Natick,	1901,	Sherbon line to Cemetery Street,	Westerly,	6,465	6,465
Natick,	1903,	Newton line,	Easterly,	1.135	53,049 14
Needham,	1901,	Charles River Bridge, Chestnut Street,	Westerly,	2.069	21,634 66
Needham,	1905,	Hardwick line to Ware line,	Northwesterly,	.995	.995
New Braintree,	1897,	New Braintree Village,	Southwesterly,	1.040	11,612 71
New Marlborough,	1903,	Sheffield line to Connecticut line,	Northwesterly,	.174	3,944 07
Newbury,	1917,	Newburyport line to Rowley line,	Easterly,	.223	.223
Newburyport,	1899-1906,	West Newbury line,	Southwesterly to southwesterly,	.230	46 85
Newburyport,	1896-7-8,	Newbury line,	Easterly,	4.231	34,042 79
Newburyport,	1918,	Bridge Street to River Street,	Northwesterly,	1.754	1.754
Newton,	1913,	Needham line,	Easterly,	.372	34,307 69
Norfolk,	1901,	Walpole line to Wrentham line,	Southwesterly,	.094	.094
North Adams,	1895,	Williamston line,	Easterly,	1.032	6,836 54
North Adams,	1894-6-7,	Ashland Street Bridge to Adams line,	Southwesterly,	1.446	16,600 54
North Adams,	1900-1-2-3,	Florida line,	Northwesterly,	2.176	2,319
North Adams,	1913,			3.644	3.644

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC.—Continued.

TOWN OR CITY.	Year.	Roads LAID OUT.			Length constructed (Miles).	Construction Ex- penditures to Dec. 1, 1919.
		From —	Direction.	Length (Miles).		
North Andover, .	1900-2-4,	Lawrence line, Pleasant and Court streets, to Haverhill line.	Southeastly, .	1.890	1.890	\$193,997.43
North Andover, .	1907-10-11-12, .	Andover Street to Middleton line, Hadley Bridge, .	Northerly, .	3.721	3.721	
Northampton, .	1913-14-15, .	Williamsburg line, .	Southeastly, .	4.993	4.993	
Northampton, .	1894, .	Easthampton line, .	Southeastly, .	.569	.569	
Northampton, .	1918, .	Easthampton line, River Road, Hatfield line, Laurel Road, .	Northeasterly, .	1.352	1.352	
Northampton, .	1897-8-9-1900-5, .	Bruce Avenue to Attleboro line, Marlborough line to Shrewsbury line, Westborough line, .	Southeastly, .	1.462	1.462	131,668 48
Northampton, .	1912, .	Grafton line, .	Southerly and southwesterly, .	1.440	1.440	
Northampton, .	1912-15, .	Uxbridge line, .	Southerly and southwesterly, .	2.180	2.180	
North Attleborough, .	1894-5-6-7-9, .	Bernardston line, .	Southerly, .	3.598	3.598	24,168 98
Northborough (East), .	1897-8-1911, .	New Hampshire line, .	Southerly, .	4.937	4.937	
Northborough (South), .	1897, .	Connecting constructed sections, Andover line to Reading line, Mansfield line, .	Northwesterly, .	.423	.423	44,153 43
Northbridge, .	1913-14-15-16, .	Norton Center, .	Southerly and southeasterly, .	3.343	3.343	
Northbridge, .	1919, .	Attleboro line to railroad station, Hingham to Hanover line, Walpole line, Westwood line, Sengenkontacket Bridge, Barre line to Rutland line, Athol line, Erving line, Brewster line to Eastham line, Brewster line to Shattuck Corner, Auburn line, Charlton line, Webster line, .	Northerly, .	1.166	1.700	87,087 94
North Brookfield, .	1905-6-7-8-10, .	North Brookfield line, .	Northerly, .	2.252	2.252	
Northfield, .	1901-2-12, .	Bernardston line, .	Northerly, .	3.040	3.040	
Northfield, .	1912, .	New Hampshire line, .	Southerly, .	1.238	1.238	
North Reading, .	1910, .	—	—	.549	—	
North Reading, .	1897-8-1901-3-11, .	Southwesterly, .	Southerly, .	2.538	2.538	23,093 06
Norton, .	1916-17, .	Southerly, .	Southerly, .	.502	.502	
Norton, .	1908-9-11, .	Easterly, .	Southerly, .	2.926	2.926	
Norwell, .	1919, .	Southeastly, .	Southerly, .	4.193	4.193	
Norwood (South), .	1897-9, .	Northwesterly, .	Northwesterly, .	2.138	—	13 80
Norwood (North), .	1895-6, .	Southerly, .	Southerly, .	1.036	1.036	
Oak Bluffs, .	1894-5-6-1917, .	Northwesterly, .	Northwesterly, .	1.087	1.087	19,980 14
Oakham, .	1917, .	Southeastly, .	Southeastly, .	2.387	2.387	20,929 85
Orange, .	1894-5-7, .	Westerly, .	Westerly, .	2.792	2.792	1,713 25
Orange, .	1900-1-3-4-5, .	Easterly, .	Easterly, .	2.183	2.183	
Orleans, .	1900-1-4, .	Northwesterly, .	Northwesterly, .	2.612	2.612	53,161 38
Orleans, .	1903-4-5, .	Northwesterly and northwesterly, .	Northwesterly and northwesterly, .	1.980	1.980	20,467 72
Oxford, .	1906-7, .	Northwesterly, .	Northwesterly, .	2.718	2.718	
Oxford, .	1908-9, .	Northwesterly, .	Northwesterly, .	.849	.849	
Oxford, .	1913-14-16, .	Northwesterly, .	Northwesterly, .	1.342	1.342	53,120 29
				2.282	2.282	

Palmer,	1899-1900-1-13,	Southeasterly to westerly,	-
Palmer,	1905-8,	Easterly,	7.179
Palmer,	1906-8-9,	Easterly,	7.526
Palmer,	1917,	Southerly,	2.336
Paxton,	1895-1902,	Northwesterly,	4.342
Pembroke,	1905-15,	Southerly,	3.597
Pepperell,	1907-10-11-14,	Northwesterly,	4.345
Petersham,	1918,	Northwesterly,	3.578
Petersham,	1919,	Southeasterly,	3.664
Phillipston,	1897-1902-4-9,	Easterly and northeasterly,	4.000
Pittsfield,	1894-8-1901-2-9-13,	Easterly,	2.785
Pittsfield,	1897-1906-7,	Southeasterly,	3.643
Pittsfield,	1904-5,	Northerly,	2.365
Plainfield,	1913,	Southerly,	1.580
Plainfield,	1894-5-11,	Southerly,	1.465
Plymouth,	1894-1904-7-10-11-13-14-16,	Southerly,	2.293
Princeton,	1897-1900-2-3,	Easterly,	14.300
Provincetown,	1901-3,	Westerly,	14.300
Provincetown,	1916,	Northwesterly,	2.230
Quincy,	1899,	Southeasterly,	1.102
Quincy,	1902-9,	Northwesterly,	2.523
Quincy,	1904,	Southeasterly,	1.465
Randolph,	1902-3-9,	Northwesterly,	1.465
Randolph,	1915,	Southeasterly,	1.465
Raynham,	1901-2-3,	Northwesterly,	1.465
Raynham,	1912-13,	Northwesterly,	1.465
Raynham,	1915,	Northwesterly,	1.465
Reading,	1899-1900-15,	Northwesterly,	1.465
Reading,	1902-3,	Northwesterly,	1.465
Rehoboth,	1895-1908,	Northwesterly,	1.465
Rehoboth,	1912,	Northwesterly,	1.465
Revere,	1897-8,	Northwesterly,	1.465
Revere,	1899-1913,	Northwesterly,	1.465
Revere,	1913-16,	Northwesterly,	1.465
Richmond,	1897-1907,	Northwesterly,	1.465
Rochester,	1903,	Westerly,	1.465
Rochester,	1909,	Southeasterly,	1.465
Rockland,	1902-5-6,	Easterly,	2.354
Rockport,	1902-6-10,	Northwesterly,	1.600
Rowley,	1905-7-8-9,	Northwesterly,	2.903
Rowley,	1911,	Northwesterly,	730
Russell,	1894-5-6-7-8-9,	Northwesterly,	6.676
Russell,	1917,	Easterly,	3.044
			93,959 40

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC.—Continued.

TOWN OR CITY.	Year.	ROADS LAID OUT.		Length (Miles).	Length con- structed (Miles).	Construc- tion Ex- penditures to Dec. 1, 1919.
		From —	Direction.			
Rutland,	1904,	Holden line,	Northwesterly,	1.160	1.160	\$9,676 09
Rutland,	1917,	Oakham line,	Easterly,	2,699	2,699	
Rutland,	1919,	Connecting sections constructed,	—	1,690	1,690	
Salem,	1901-9,	Swampscott line,	Northeasterly,	1,398	1,398	
Salem,	1914,	Lynn line,	Northeastery,	1,912	1,912	71,102 13
Salisbury,	1916,	Broadway to New Hampshire line,	Northerly,	2,020	2,020	
Salisbury,	1904-5-12,	Salisbury Village to Newburyport Bridge,	Southerly,	1,560	1,560	
Salisbury,	1910,	New Hampshire line to village,	Southerly,	2,409	2,409	97,986 20
Salisbury,	1911-12,	Amesbury line,	Southerly,	1,744	1,744	
Salisbury,	1913-14,	Salisbury Square to Salisbury Beach,	Southeasterly,	2,170	2,170	
Salisbury,	1897-8-1900-2-10-12-13-19,	Barnstable line to Brown line,	Westerly and northwesterly,	7,599	7,599	
Sandwich,	1914,	Mashpee line to Barnstable line,	Southeasterly,	.114	.114	72,218 22
Sandwich,	1919,	Sandwich Village,	Southerly,	1,817	1,817	
Saugus,	1899-1913,	Fox Hill Bridge to Revere line,	Southwesterly,	1,641	1,641	
Saugus,	1906-14,	Melrose line to Newburyport Turnpike,	Southeasterly,	.864	.864	100,634 93
Saugus,	1917,	Melrose line to Newburyport Turnpike,	Northerly,	.850	.850	
Saugus,	1919,	Lynnfield line,	Southerly,	3,122	500	
Savoy,	1913,	Florida and Savoy at Cold River,	Southerly,	.045	.045	
Savoy,	1914,	Florida line to Charlestown line,	Easterly,	1,765	1,765	7,537 04
Seituate,	1894-1910,	Cassett line to Mansfield line,	Southerly,	5,374	5,374	
Seekonk,	1900-1-2-4,	Rehoboth line to Rhode Island line,	Westerly,	2,757	2,757	49,171 58
Seekonk,	1910-11-13,	Perry Avenue to Rehoboth line,	Southeasterly,	3,272	3,272	
Sheffield,	1908,	Foxborough line,	Northeasterly to northerly,	5,600	5,600	44,326 69
Sheffield,	1912-13-14-15-17,	Connecticut line via Ashley Falls Road,	Northerly,	3,284	3,284	
Sheffield,	1914-15-18,	Great Barrington line,	Southerly,	2,620	2,620	66,960 42
Shelburne,	1919,	Bridge Street to Colrain line,	Northwesterly,	2,159	2,159	
Shelburne,	1894-5-6,	Bridge Street,	Northeasterly,	4,424	—	30,822 23
Shelburne,	1916,	Greenfield line,	Westerly and southerly,	2,796	.250	
Shirley,	1919,	Ayer line to Lunenburg line,	Westerly,	3,618	59,953 34	
Shrewsbury,	1895-1904,	Worcester line to Northborough line,	Northeasterly,	4,854	4,854	48,948 67
Somerset,	1895-1910-14-15,	Slades Ferry Bridge to Swansea line,	Northerly,	5,379	5,379	
Somerset,	1903-4-9,	Slades Ferry Bridge, Brayton Avenue,	Westerly and southerly,	2,401	2,401	
Somerset,	1909-15,	Junction of Riverside and Brayton Avenue,	Northeasterly,	.286	.286	82,370 94
Somerset,	1914-15,	nues to Swansea line, .	Westerly and northwesterly,	1.853	1.853	

Somerville,	1908,	Southeastly,	1.160	50,441 07
Somerville,	1914,	Northerly, . . . . .	.423	.423
Southampton,	1905-9,	Southerly, . . . . .	.708	13,948 99
Southborough,	1902-5,	Easterly,	1.895	1.895
Southborough,	1907,	Westerly, . . . . .	.653	.653
Southborough,	1909,	Southwesterly,	1.143	1.143
Southborough,	1909,	Southwesterly, . . . . .	.909	.909
Southborough,	1909,	Easterly, . . . . .	.448	.448
Southborough,	1909,	Southwesterly,	2.419	2.419
Southborough,	1909,	Northeasterly,	4.637	4.637
Southborough,	1909,	Southerly, . . . . .	.315	.315
Charlton line,	1902,	Westerly,	1.600	1.600
Charlton line,	1902,	Easterly,	1.459	1.459
Sturbridge,	1907,	Southerly,	2.700	2.700
South Hadley,	1895-7-8-9-1900,	Southwesterly,	2.413	2.413
South Hadley,	1903-4-9-12,	Southerly,	5.745	5.745
South Hadley,	1915,	Westerly,	1.066	1.066
Leicester line,	1897-1900-1,	Southwesterly,	2.229	2.229
Leicester line,	1906-10-11,	Northerly, . . . . .	.958	.958
Spencer,	1897-8-1912,	Southerly, . . . . .	.569	.569
Sterling,	1905-6-9-14-15,	Southerly,	1.013	1.013
Sterling,	1906-7-13-14,	Northerly,	1.160	1.160
Stockbridge,	1905-9,	Northwesterly to northerly,	2.143	2.143
Stockbridge,	1906,	Northwesterly,	2.258	2.258
Stockbridge,	1917,	Northwesterly,	2.353	2.353
Stoneham,	1907-8,	Easterly,	5.114	5.114
Stoneham,	1900-1,	Southerly,	3.971	3.971
Stoughton,	1902-3,	Southerly,	1.458	1.458
Stoughton,	1904-5,	Northerly, . . . . .	.822	.822
Stoughton,	1914-5,	Northwesterly,	1.491	1.491
Starbridge,	1897-1903-4-7-9,	Northwesterly,	6.649	6.649
Sudbury,	1897-8-1900-1-2-3,	Northwesterly,	2.811	2.811
Sunderland,	1897-1903-4-5-7-9-13-14,	Northwesterly,	2.933	2.933
Sutton,	1899-1901-2,	Northwesterly,	1.357	1.357
Sutton,	1903-4,	Southwesterly,	2.366	2.366
Swampscott,	1897-1900-1,	Westerly, . . . . .	.383	.383
Swansea,	1903-6-7-9-10-11-12,	Westerly,	1.477	1.477
Swansea,	1915-16,	Northwesterly,	2.116	2.116
Taunton,	1895-6-8-9-1900-1,	Southwesterly,	2.002	2.002
Taunton,	1905-6-13,	Westerly,	3.686	3.686
Taunton,	1907-13,	Northwesterly,	6.186	6.186
Taunton,	1912,	Southwesterly,	1.926	1.926
Taunton,	1914-17,	Westerly,	6.034	6.034
Taunton,	1919,	Westerly,	2.933	2.933
Templeton,	1899-1901-2-3,	Northwesterly,	1.357	1.357
Tewksbury,	1905-6-7-8-9,	Southwesterly,	2.366	2.366
Tisbury,	1900-1-2-3-4-5-6-15,	Westerly,	120,388 89	120,388 89
Townsend,	1894,	Westerly,	6.034	6.034
Townsend,	1896-1911,	Westerly,	46,978 99	46,978 99

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC.—Continued.

TOWN OR CITY.	Year.	ROADS LAID OUT.			Length con- structed (Miles).	Construction Ex- penditures to Dec. 1, 1919.
		From —	Direction.	Length (Miles).		
Truro,	1895-1906,	Wellfleet line via Kelly's Corner,	Northwesterly and northerly,	7.623	7.623	\$63,800 51
Tyngsborough,	1895-6,	Tyngsborough Bridge to Lowell line,	Southeasterly,	2.942	2.942	
Tyngsborough,	1899-10-11-12-13;	New Hampshire line to Chelmsford line,	Southerly and northwesterly,	3.998	3.998	
Upton,	1918,	Grafton,	Southeasterly,	1.034	1.034	
Upton,	1919,	Hopdale line,	Northwesterly,	2.458	2.458	
Uxbridge,	1897-8-1901-3-6-9-10-16,	Millville line to village,	Northwesterly,	3.617	3.617	
Uxbridge,	1902-14,	Northbridge line to Munford River Bridge,	Southwesterly,	1.198	1.198	
Wales,	1901,	Brimfield line,	Southwesterly,	1.040	1.040	
Walpole (South),	1894-5-7-1900-12-16,	Norfolk line,	Northeastery,	3.307	3.307	
Walpole (North),	1897-8-1900-11,	New Braintree line,	Southerly,	1.970	1.970	
Ware,	1897-9-1900-3,	Junction of Palmer and Belchertown roads,	Northeastery,	2.282	2.282	
Ware,	1909-10,	Weweantic River Bridge to High Street,	Northeastery,	1.894	1.894	
Wareham,	1896-1901-6-7-10,	Cohasset Narrows Bridge to Wareham	Westerly and southwesterly,	2.195	2.195	
Wareham,	1898-1901-3-10-17,	Narrows Bridge,	Northwesterly,	6.639	6.639	
Wareham,	1905-6-7-8,	Parker's Mills to Rochester line,	Westerly,	3.404	3.404	
Wareham,	1919,	Parker's Mills,	Southerly,	.300	.300	
Warren,	1896-7-8-1900-7-8,	Warren Village to Palmer line,	Westerly,	2.690	2.690	
Warren,	1899-1900-1,	Warren Village to West Brookfield line,	Easterly,	1.410	1.410	
Watertown,	1919,	Waitham line,	Easterly,	.840	.840	
Wayland,	1895-6,	Weston line to Sudbury line, ¹	Westerly,	.850	.850	
Webster,	1897-1900-3,	Lake Street and Thompson's Road to Connecticut line,	Westerly,	2.581	2.581	
Webster,	1908-12,	Oxford,	Southerly,	1.772	1.772	
Webster,	1911,	Natick line to Blossom Street,	Easterly,	.831	.831	
Wellfleet,	1901,	Eastham line to Truro line,	Southerly,	1.176	1.176	
Wenham,	1893-4-5-7-15,	Beverly line to Hamilton line,	Northerly and northwesterly,	7.366	7.366	
Westborough,	1897-1901-3,	Southborough line,	Northerly,	1.762	1.762	
Westborough,	1903-6,	Northborough line,	Southeastery,	2.277	2.277	
West Boylston,	1897-8-1913-15,	Worcester line to Sterling line,	Northerly,	.714	.714	
West Bridgewater,	1900-1-2-4,	Brockton line to Bridgewater line,	Southerly,	4.303	4.303	
West Bridgewater,	.	.	.	3.161	3.161	

West Brookfield,	1899,	Ware line to Ware line,	Southwesterly,	.151
West Brookfield,	1899-1900-1,	Brookfield line,	Northwesterly,	1.506
West Brookfield,	1905-13,	Warren line,	Easterly,	1.172
Westfield,	1894-6-8-9,	West Springfield line,	Westerly,	2.220
Westfield,	1898-9-1900-1-2,	Russell line,	Northerly and southwesterly,	2.220
Westford,	1902-12,	Littleton line to Chelmsford line,	Northerly,	3.584
Westford,	1903,	Minot's Corner to Westford Village,	4.150	45
Westminster,	1894-5-6-7-8-9-1918,	Fitchburg line to Gardner line,	Southwesterly,	4.150
Westminster,	1915,	Fitchburg line to Groveland line,	Northwesterly,	5.799
West Newbury,	1895-6-7-1903-4-5-6-9,	Newbury line to Groveland line,	Westerly,	5.755
Weston,	1898-9,	Wayland line to Stony Brook,	Easterly,	5.755
Westport,	1894-5-7-8-1903,	Dartmouth line to Fall River,	Westerly and southeasterly,	5.755
West Springfield,	1895-6-1905-6-12-13,	Westfield line,	Easterly,	4.771
West Tisbury,	1895-6-7-1904,	Tisbury line to Chilmark line,	Southwesterly,	4.771
Westwood,	1899-1900-13-16,	Norwood line to Dedham line,	Northerly,	2.704
Weymouth,	1894,	Holbrook line to Abington line,	Easterly,	5.358
Weymouth,	1895-6-7,	Back River line to Abington line,	Easterly,	1.071
Weymouth,	1903-4-7-8-10,	Broad Street via Washington to Abington line,	Easterly,	1.248
Weymouth,	1915,	Hingham line,	Southerly,	1.780
Whately,	1899-1901-2-3-4-5-6,	Deerfield line to Hatfield line,	Northwesterly,	4.937
Whitman,	1913-14,	Brockton line,	Southerly,	2.150
Wilbraham,	1894-5-6-1901-3-4-13,	East Bridgewater line to Abington line,	Easterly,	4.026
Williamsburg,	1896-8-1901-3-16,	Springfield line to Palmer line,	Northerly,	4.026
Williamstown,	1907,	Coshen line,	Easterly,	1.697
Williamstown,	1895-6-8-1903,	River Road from village,	Southeasterly,	2.293
Williamstown,	1917,	North Adams line,	Southerly,	5.055
Wilmington,	1907-8-10-11,	Pownal line,	Westerly,	5.055
Winchendon,	1907,	Tewksbury line to Woburn line.	Southeasterly,	1.465
Winchendon,	1907,	Glen Allen Road via Maple Street,	Southerly,	1.465
Winchendon,	1916,	Miller's River Bridge, River Street,	Southwesterly,	1.197
Winchendon,	1919,	Ashburnham line,	Northwesterly,	3.678
Winchester,	1899-1900,	New Hampshire line,	Southerly,	1.347
Windsor,	1897-1902-3-6-7-13-15,	Abington line to Woburn line,	Northeasterly,	.352
Windsor,	1919,	Cummington line,	Westerly,	3.164
		Dalton line,	Northeasterly,	2.493
				2.493
				1.952
				1.952
				1.903
				1.563
				1.600

¹ Exclusive of bridge and railroad crossing.

SHOWING THE HIGHWAYS LAID OUT OR CONTRACTED FOR BY THE MASSACHUSETTS HIGHWAY COMMISSION, ETC. — *Concluded.*

TOWN OR CITY.	Year.	ROADS LAID OUT.		Length con- structed (Miles).	Construction Ex- penditures to Dec. 1, 1919.
		From —	Direction.		
Woburn,	1900-1-2,	Winchester line to Burlington line,	Northwesterly,	2.033	2.033
Woburn,	1912-13,	Wilmington line,	Southwesterly,	.982	.982
Woburn,	1915-16-17,	Lexington line,	Northeasterly,	2.471	2.471
Worcester,	1896-7,	Paxton line,	Southeastery,	1.356	1.356
Worcester,	1897-1903,	Holton line,	Southerly,	1.500	1.500
Worcester,	1900-5,	West Boylston line,	Southerly,	1.216	1.216
Wrentham,	1897-8-9-1900-2-14,	Plainville line to Norfolk line,	Northerly,	4.927	4.927
Wrentham,	1912-13,	Franklin line,	Southeastery,	2.041	2.041
Wrentham,	1915,	Foxborough,	Southwesterly,	2.549	2.549
Yarmouth (North),	1894-5-6,	Barnstable line to Dennis,	Easterly,	3.716	3.716
Yarmouth (South),	1895-6-7,	Barnstable line to Bass River Bridge,	Easterly,	5.082	5.082

APPENDIX D.

TABLE SHOWING TOWNS AND CITIES IN WHICH WORK HAS BEEN DONE DURING THE YEAR 1919, AND RESIDENT ENGINEERS ON SUCH WORK, TOGETHER WITH DATES OF BEGINNING AND ENDING.

TOWN OR CITY.	Co. County.	Year.	Resident Engineers.	Date of Contract.	Date of Beginning, 1919.	Date of Ending, 1919.
Acton,	Middlesex,	1919,	Harvey S. Jewell,	Apr. 22, 1919	Nov. 22	
Acton,	Middlesex,	1919,	John R. Delehanty,	Apr. 22, 1919	Mar. 26	
Agawam,	Hampden,	1919,	Francis P. Atkinson,	Sept. 8, 1919	May 1	
Amherst,	Hampshire,	1919,	Carl H. Morrill,	Aug. 10, 1919	July 21	
Ashby,	Middlesex,	1917,	Lewis R. Selle,	Sept. 26, 1917	Dec. 31	
Ashby,	Middlesex,	1917,	C. A. Welton,	Sept. 26, 1917	Dec. 14	
Athol,	Worcester,	1919,	F. T. McAvoy,	Sept. 26, 1917	July 14	
Athol,	Worcester,	1919,	R. H. Hosford,	May 6, 1919	July 24	
Barnstable (West),	Barnstable,	1919,	B. C. French,	May 6, 1919	July 24	
Barnstable,	Barnstable,	1918,	C. E. Manchester,	Sept. 16, 1919	Oct. 8	
Becket,	Berkshire,	1918,	Anthony Weldon,	Aug. 13, 1918	Feb. 1	
Becket,	Berkshire,	1917,	Raymond H. Houston,	Apr. 9, 1918	Jan. 1	
Becket,	Berkshire,	1917,	Reuben Barker,	Apr. 9, 1918	Apr. 9	
Becket,	Berkshire,	1917,	P. H. Ladd,	Apr. 9, 1919	May 15	
Becket,	Berkshire,	1917,	H. D. Fallon,	Apr. 9, 1919	June 16	
Belchertown,	Western counties,	1919,	E. H. Smith,	Sept. 18, 1919	Nov. 15	
Brainerd,	Norfolk,	1919,	M. J. Dalton,	June 25, 1919	July 16	
Brainerd,	Norfolk,	1919,	Timothy F. Cremen,	June 25, 1919	Dec. 10	
Braintree (West),	Norfolk,	1919,	Rowland R. Lowe,	June 25, 1919	Sept. 29	
Charlton,	Worcester,	1919,	Warren B. Bye,	Aug. 20, 1919	Oct. 12	
Colasset,	Plymouth,	1919,	George F. Maynard,	July 1, 1919	Oct. 11	
Concord,	Middlesex,	1919,	Harvey S. Jewell,	Apr. 22, 1919	Mar. 25	
Concord,	Middlesex,	1919,	John R. Delehanty,	Apr. 22, 1919	Mar. 26	
Dalton,	Berkshire,	1919,	H. B. Carsley,	Apr. 2, 1919	May 1	
Dalton,	Berkshire,	1919,	E. F. Moran,	Apr. 2, 1919	Sept. 6	
Danvers,	Essex,	1919,	Arthur P. Rice,	Apr. 22, 1919	Oct. 25	

TABLE SHOWING TOWNS AND CITIES IN WHICH WORK HAS BEEN DONE DURING THE YEAR 1919, ETC.—Concluded.

Town or City.	County.	Year.	Resident Engineers.	Date of Contract.	Date of Beginning, 1919.	Date of Ending, 1919.
Danvers,	Essex,	1919,	A. L. Ford,	Apr. 22, 1919	Aug. 16	
Danvers,	Essex,	1919,	Roger W. Bell,	Apr. 22, 1919	Aug. 16	
Egremont,	Berkshire,	1917,	Anthony Weldon,	Sept. 4, 1918	July 1	
East Bridgewater,	Plymouth,	1918,	H. O. Parker,	June 4, 1918	Oct. 25	
Fitchburg,	Worcester,	1919,	C. A. Welton,	May 29, 1918	Apr. 29	
Freetown,	Bristol,	1919,	Harry Sharpe,	Sept. 28, 1919	Dec. 13	
Great Barrington,	Berkshire,	1919,	Reuben Barker,	Sept. 2, 1919	Aug. 30	
Great Barrington,	Berkshire,	1919,	Carl W. Sterl,	Sept. 2, 1919	Dec. 16	
Greenfield,	Franklin,	1919,	H. W. Ingham,	Sept. 18, 1919	Sept. 18	
Greenfield,	Franklin,	1919,	L. W. Brown,	Sept. 19, 1919	Sept. 18	
Hancock,	Berkshire,	1919,	A. E. Page,	July 29, 1919	June 30	
Hancock,	Plymouth,	1919,	Geo. F. Maynard,	July 1, 1919	May 21	
Hingham,	Berkshire,	1919,	William J. Hurley,	Sept. 18, 1919	Sept. 27	
Hinsdale,	Norfolk,	1919,	George F. Maynard,	May 27, 1919	Mar. 11	
Holbrook,	Essex,	1919,	F. A. Chase,	—	Nov. 29	
Ipswich,	Essex,	1919,	R. E. Chase,	—	Sept. 22	
Ipswich,	Essex,	1919,	Benji Kerstein,	—	Dec. 20	
Ipswich,	Berkshire,	1919,	Anthony Weldon,	Oct. 7, 1919	July 16	
Ipswich,	Worcester,	1919,	W. T. Case,	Sept. 9, 1919	Nov. 11	
Leominster,	Middlesex,	1919,	John E. Troy,	June 23, 1919	Dec. 6	
Lincoln,	Middlesex,	1919,	H. S. Jewell,	Apr. 22, 1919	Dec. 13	
Littleton,	Middlesex,	1919,	John R. Delohanty,	Mar. 25, 1919	Nov. 22	
Lowell,	Middlesex,	1919,	William A. McDougal	Apr. 22, 1919	May 1	
Mansfield (North),	Bristol,	1919,	A. T. Edwards,	Sept. 1, 1919	Oct. 4	
Middleton,	Essex,	1919,	H. O. Weisch,	—	Oct. 20	
Newburyport,	Essex,	1919,	Lewis J. Fritz,	Sept. 22, 1919	Sept. 2	
Newburyport,	Essex,	1919,	Walter E. Tilton,	Sept. 22, 1919	July 23	
Newburyport,	Essex,	1919,	John D. Tatton,	Sept. 22, 1919	Dec. 20	
Newburyport,	Essex,	1919,	Roger W. Bell,	Sept. 22, 1919	Dec. 20	
Newburyport,	Essex,	1919,	W. B. Haughey,	Sept. 22, 1919	Nov. 11	
Newburyport,	Essex,	1919,	H. F. Marnell,	Sept. 22, 1919	Sept. 29	
Northbridge,	Worcester,	1919,	T. F. Hanron,	July 29, 1919	July 26	
Northbridge,	Worcester,	1919,	E. T. Donovan,	July 29, 1919	Nov. 29	
Northbridge,	Worcester,	1919,	H. J. Ellis,	July 29, 1919	Dec. 13	
North Brookfield,	Worcester,	1919,	Herbert Green,	Oct. 21, 1919	Sept. 13	
Pembroke,	Plymouth,	1919,	E. N. Briggs,	Apr. 15, 1919	Oct. 11	
Petersham,	Worcester,	1919,	F. S. McAvoy,	May 6, 1919	Apr. 9	

APPENDIX E.

SHOWING CONTRACT PRICES ON

TOWN OR CITY.	Contractor.	EXCAVATION.			Portland Cement Concrete Masonry (Cubic Yard).	BITUMINOUS SURFACING.			
		Earth (Cubic Yard).	Borrow (Cubic Yard).	Ledge (Cubic Yard).		Asphalt (Square Yard).	Asphalt (Gallon).	Tar (Square Yard).	
Amherst, . . .	West Roxbury Trap Rock Company.	\$2 00	\$1 50	\$4 00	\$20 00	2\$22 00	\$20 00	\$0 55	\$0 18
Athol-Petersham, . . .	Lane Construction Company.	1 25	1 25	3 50	25 00	102 50	.08	-	-
Barnstable, . . .	Town of Barnstable, . . .	1 25	1 50	4 00	26 00	12 95	181 10	14 00	16
Becket, . . .	J. H. Kerr, . . .	1 55	2 00	9 00	39 00	-	-	153 00	16
Braintree, . . .	Cenedella & Co., . . .	1 20	1 60	5 00	18 00	181 00	-	-	-
Charlton, . . .	Carlo, Bianchi & Co., Inc.	1 50	1 50	5 00	520 00	102 00	-	-	-
Cheshire, . . .	D. S. McGrath & Co., . . .	1 00	2 50	-	25 00	2007	-	-	-
Concord-Acton-Littleton.	James H. Gannon, . . .	1 50	1 75	5 00	25 00	-	.08	-	-
Cummington, . . .	Michael L. Camarea, . . .	1 35	1 50	4 00	340 00	102 25	530 00	2235 00	25
Cummington, . . .	Michael L. Camarea, . . .	-	-	-	252 25	2645	-	71 25	-
Dalton-Windsor, . . .	Ferguson & Cefalo, . . .	1 41	1 70	4 00	22 00	-	-	-	-
Danvers, . . .	Nelson & Hamblin, . . .	1 15	1 30	3 25	23 00	-	.09	-	-
Freetown, . . .	Canton Engineering Company.	14 00	2 00	-	232 00	-	-	-	20
Grafton, . . .	Town of Grafton, . . .	34-	-	-	-	-	-	-	-
Great Barrington, . . .	Lane Construction Company.	1 25	1 25	4 00	518 00	-	-	-	-
Greenfield-Bernardston.	West Roxbury Trap Rock Company.	1 50	1 50	4 00	30 00	101 50	240 00	-	3685
Greenfield-Shelburne	Coleman Brothers, . . .	40 90	1 50	4 00	15 00	29200 00	413 50	323 00	101 50
Hingham-Norwell, . . .	Rowe Contracting Company.	1 25	1 50	5 00	25 00	101 50	-	-	-

¹ Bridge excavation (cubic yard).² 1 : 2½ : 5 concrete masonry for bridge.³ 1 : 2½ : 5 concrete arch masonry.⁴ Scarifying and reshaping macadam.⁵ 1 : 2½ : 5 concrete masonry for culverts.⁶ 1 : 2 : 4 concrete masonry for bridge fences (cubic yard).⁷ Water proofing (square yard).⁸ Rock embankment (cubic yard).⁹ Spruce piles.¹⁰ Gravel borrow (cubic yard).¹¹ Eighteen-inch corrugated iron pipe (lineal foot).¹² Sand and asphalt surfacing in place, 4-inch at center, 2½-inch sides.¹³ Sand and asphalt surfacing in place, 4-inch at center, 4-inch sides.¹⁴ Ten-inch corrugated iron pipe.¹⁵ Sand for filling voids in broken stone.¹⁶ Broken stone excavated and replaced (cubic yard).¹⁷ Including loosening, scarifying and replacing macadam (ton).¹⁸ Cobblestone gutter (square yard).¹⁹ Fifteen-inch corrugated iron pipe.²⁰ Steel used for reinforcing concrete (per pound).²¹ Rubble stone masonry (cubic yard).²² Concrete masonry for spandril walls (cubic yard).²³ Concrete boulder masonry (cubic yard).

APPENDIX E.

STATE HIGHWAYS DURING 1919.

Concrete Surfacing (Cubic Yard.)	BROKEN STONE.		PIPE CULVERTS (LINEAL FOOT).						Fencing (Lineal Foot).	Stone Filling for Under-drains (Cubic Yard.).	Bounds (Each).	Catch Basins (Each).				
			CLAY.			CORRUGATED IRON.										
	Local (Ton.)	Trap (Ton.)	Ten-inch.	Twelve-inch.	Fifteen-inch.	Twelve-inch.	Fourteen-inch.	Sixteen-inch.								
\$20 00	\$2 75	\$22 00	7\$1 00	8\$3 00	9\$25 00	-	-	\$1 00	\$0 50	\$3 00	\$2 00	\$100 00				
-	2 75	3 80	-	-	13 25	\$2 25	\$2 35	3 00	45	2 50	4 00	-				
-	-	-	-	-	-	2 50	2 75	12 00	60	-	2 50	45 00				
12 71	-	174 61	-	-	-	-	-	-	-	3 00	-	-				
10 90	-	-	-	112 60	141 60	1 75	2 00	192 50	70	1 60	5 00	60 00				
12 75	-	-	-	-	-	2 00	-	-	60	-	5 00	-				
-	-	-	-	-	-	-	-	-	-	1 85	-	-				
2112 00	3 40	4 00	-	-	-	-	-	-	75	-	3 00	75 00				
15 00	3 25	45 00	2325 00	1 50	243 50	2 25	113 25	2 60	60	2 25	5 00	60 00				
82 95	-	-	-	-	-	271 00	281 20	-	38	-	-	-				
83 75	3 15	-	29169 50	-	113 50	2 80	302 00	302 00	60	2 43	6 00	3160				
101 80	3 00	-	1 10	1 15	1 40	2 50	322 00	-	50	-	4 00	50 00				
637 00	5 00	32 50	-	-	-	-	-	-	75	-	6 00	-				
-	-	-	-	-	-	-	-	-	-	-	-	-				
12 00	-	-	-	322 00	352 75	-	-	3 00	60	-	4 00	-				
15 00	3 00	82 00	371 50	382 00	-	1 75	113 50	395 00	50	-	3 00	75 00				
13 00	2785	281 00	142 25	4275	4380	2 40	2 60	2 75	40	2 50	3 00	130 00				
10 40	-	-	1 50	441 25	142 00	2 15	1113 00	2 75	65	1 75	4 00	65 00				

²⁴ Twelve-inch iron water pipe.²⁵ Riprap in place (cubic yard).²⁶ Cribbing in place (square foot).²⁷ Twelve-inch corrugated iron pipe relaid.²⁸ Eighteen-inch corrugated iron pipe relaid.²⁹ Grubbing and clearing (per acre).³⁰ 12 and 18-inch corrugated iron pipe furnished by Commission.³¹ Rustic fencing (lineal foot).³² Eighteen-inch vitrified clay pipe.³³ Removing old parapet wall (cubic yard).³⁴ \$2,000, lump sum.³⁵ Twenty-four-inch vitrified clay pipe.³⁶ Bituminous concrete surfacing.³⁷ Gravel surfacing (cubic yard).³⁸ Side drains (lineal foot).³⁹ Twenty-four-inch corrugated iron pipe.⁴⁰ Excavation, except clearing and grubbing.⁴¹ Twenty-inch corrugated iron pipe.⁴² Six-inch corrugated iron pipe relaid.⁴³ Ten-inch corrugated iron pipe relaid.⁴⁴ Eight-inch vitrified clay pipe.

SHOWING CONTRACT PRICES ON

TOWN OR CITY.	Contractor.	EXCAVATION.			BITUMINOUS SURFACING.			
		Earth (Cubic Yard).	Borrow (Cubic Yard).	Ledge (Cubic Yard).	Portland Cement Concrete Masonry (Cubic Yard).	Asphalt (Square Yard).	Asphalt (Gallon).	Tar (Square Yard).
Lanesborough, .	Daniel J. Walsh, .	\$1 50	\$2 00	\$3 00	\$25 00	-	-	\$25 00
Lexington, .	John A. Gaffey, .	1 40	1 40	4 00	25 00	\$1 50	-	-
Lunenburg, .	Rowe Contracting Company.	1 40	1 75	6 00	30 00	\$2 75	-	-
Mansfield, .	Snow & Farrington, .	1 25	-	\$1 35	-	-	-	10 01 1/2
Northbridge, .	Chas. E. Horne, .	1 50	1 50	4 00	20 00	\$1 65	\$0 09	-
North Brookfield, .	Hinman & Rudiger, .	1 50	1 70	4 00	30 00	-	-	-
Northfield, .	Lane Construction Company.	2 00	2 00	\$3 00	-	-	-	20
Princeton, .	Luigi C. Carchia, .	1 35	2 50	4 00	30 00	\$1 50	-	-
Pittsfield-Hancock, .	Carl B. Lindholm, .	1 75	2 00	\$2 75	-	-	-	-
Randolph, .	Martino De Matteo, .	2 00	2 00	\$2 50	-	-	-	16
Saugus, .	Welsh & Moynihan, .	1 40	1 25	4 00	30 00	158 00	08 1/2	\$1 85
Seekonk, .	Joseph McCormick, .	2 00	2 55	-	-	-	08	-
Southwick, .	Luigi, Luchini & Son,	1 40	1 75	4 00	20 00	-	-	-
Taunton, .	Eastern Construction Company.	95	1 25	4 00	122 00	201 50	2170	-
Tewksbury-Wilmington.	G. Ferullo & Co., .	231 65	1 55	6 00	10 00	-	08	-
Wareham, .	Wm. A. Jones, .	2 00	1 90	\$1 50	-	-	-	20
Wareham, .	Wm. A. Jones, .	1 25	1 50	\$1 00	-	-	-	20
Warren, .	Carlo Bianchi & Co., .	1 30	1 60	\$1 60	\$2 35	-	-	-
Westborough, .	Town of Westborough,	24-	-	-	-	-	-	-
Weymouth, .	Marshfield Construction Company.	1 85	1 60	\$1 60	-	-	-	13 1/2
Weymouth, Hingham and Cohasset.	Ezekiel C. Sargent, .	1 90	2 50	\$2 75	-	-	-	15
Worthington, .	Middlesex Construction Company.	1 30	1 30	3 60	26 00	\$20 00	\$25 50	26250 00
								12

¹ 1 : 2 1/2 : 5 concrete masonry for culverts.² 1 : 2 1/2 : 5 concrete masonry for bridge.³ Gravel borrow (cubic yard).⁴ Rock embankment (cubic yard).⁵ Eighteen-inch corrugated iron pipe (lineal foot).⁶ Slag filling.⁷ Eighteen-inch vitrified clay pipe.⁸ Broken stone excavated and replaced (cubic yard).⁹ Sand for filling voids in broken stone.¹⁰ Bituminous surfacing, except furnishing and application of tar.¹¹ Sixteen-inch vitrified clay pipe.¹² Eight-inch vitrified clay pipe.¹³ Eighteen-inch corrugated iron pipe relaid.¹⁴ Including loosening, scarifying and replacing macadam (ton).¹⁵ Cement stone masonry (cubic yard).¹⁶ Curb inlets in place (each).

STATE HIGHWAYS DURING 1919 — *Concluded.*

Concrete Surfacing (Cubic Yard).	BROKEN STONE.		PIPE CULVERTS (LINEAL FOOT).								Fencing (Lineal Foot).	Stone Filling for Under-drains (Cubic Yard).	Bounds (Each).	Catch Basins (Each).				
			CLAY.				CORRUGATED IRON.											
	Local (Ton).	Trap (Ton).	Ten-inch.	Twelve-inch.	Fifteen-inch.	Twelve-inch.	Fourteen-inch.	Sixteen-inch.										
\$14 00	3\$2 00	4\$3 00	-	-	-	\$3 50	-	5\$3 50	\$0 50	6\$2 00	\$4 00	-	-	-				
-	3 30	-	\$1 00	7\$2 25	-	-	-	-	70	-	3 00	-	-	-				
12 50	-	-	-	-	-	-	-	-	-	2 25	-	-	-	-				
-	3 10	-	-	-	-	-	-	-	-	-	-	-	-	-				
15 50	3 60	-	1 50	1 75	11\$2 50	121 50	13\$2 50	-	80	-	2 50	\$70 00	-	-				
82 75	4 25	-	-	-	-	-	-	-	-	-	-	-	-	-				
-	4 80	-	-	-	-	-	-	-	-	3 50	5 00	-	-	-				
91 50	3 50	-	-	-	-	-	3 00	-	1 00	2 00	-	-	-	-				
12 25	-	-	-	-	-	-	-	-	-	3 00	-	-	-	-				
-	143 90	-	-	-	-	-	-	-	-	-	-	-	-	-				
240 00	3 20	1610 00	1 35	1 50	2 00	73 00	-	175 00	55	1820 00	4 50	50 00	-	-				
-	93 40	-	-	-	-	-	-	-	-	-	-	-	-	-				
-	3 40	91 75	-	-	-	2 00	-	192 00	80	2 75	-	-	-	-				
11 75	-	-	-	-	-	1 75	221 65	2 15	70	2 50	3 00	80 00	-	-				
-	143 65	-	1 50	-	72 50	-	-	-	60	-	-	40 00	-	-				
-	144 40	-	-	-	-	-	-	-	-	-	4 00	-	-	-				
-	144 10	-	-	-	-	-	-	-	-	-	-	-	-	-				
-	3 60	-	-	-	-	-	-	-	-	2 40	-	-	-	-				
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
-	154 05	-	-	-	-	-	-	-	-	-	-	-	-	-				
-	3 50	143 95	83 95	-	-	-	-	-	-	-	-	-	-	-				
185 00	-	42 00	2740 00	232 00	284 00	2 25	176 00	53 50	40	2 75	-	-	-	-				

¹⁷ Eighteen-inch iron water pipe.¹⁸ Bridge excavation (cubic yard).¹⁹ Side drains (lineal foot).²⁰ Cobblestone gutter (square yard).²¹ Cobblestone gutter relaid (square yard).²² Ten-inch corrugated iron pipe.²³ Excavation and removal of oil surface.²⁴ \$2,000, lump sum.²⁵ Gravel surfacing (cubic yard).²⁶ Grubbing and clearing (per acre).²⁷ 1 : 2 : 4 concrete masonry for bridge fences (cubic yard).²⁸ Twelve-inch iron water pipe.

APPENDIX F.

STATEMENT OF CLAIMS AGAINST THE COMMISSION.

[As required by section 5, chapter 18 of the Revised Laws.]

NAME.	Residence.	Nature of Claim.
Anderson, Ellen, . . .	Saugus, . . .	Damages due to construction of State highway in Saugus.
Beman, Richard D., . . .	Becket, . . .	Damage due to accident alleged to have occurred on State highway in Becket.
Boudreau, William, . . .	Wilmington, . . .	Damage due to accident alleged to have occurred on State highway in Wilmington.
Bray, Lizzie A., . . .	Gloucester, . . .	Damages due to construction of State highway in Gloucester.
Clifford, John A., . . .	Salisbury, . . .	Damages due to construction of State highway in Salisbury.
Coleman, John H., . . .	Gloucester, . . .	Damages due to construction of State highway in Gloucester.
Daniels, Margaret J., . . .	Saugus, . . .	Damages due to construction of State highway in Saugus.
Farnum, Elizabeth M., . . .	Uxbridge, . . .	Damages due to construction of State highway in Uxbridge.
Flagg, Lucretia T., . . .	Northampton, . . .	Damages due to construction of State highway in Northampton.
Follansbee, Daniel, . . .	Salisbury, . . .	Damages due to construction of State highway in Salisbury.
Fuller, Reuben H., . . .	Mashpee, . . .	Damages due to construction of State highway in Mashpee.
Garr, Craig,	Northbridge, . . .	Damages due to construction of State highway in Northbridge.
Goward, Louis B. and Florence E.	Taunton, . . .	Damages due to construction of State highway in Taunton.
Haskell, Edith L., . . .	Gloucester, . . .	Damages due to construction of State highway in Gloucester.
Henderson, Arthur, . . .	Saugus, . . .	Damages due to construction of State highway in Saugus.
Ireson, Jennie E., . . .	Wrentham, . . .	Damages due to construction of State highway in Wrentham.
Jacques, Rose,	Grafton, . . .	Damages due to construction of State highway in Grafton.
Kneisel, Joseph,	Dedham, . . .	Damages due to construction of State highway in Dedham.
Lemon, Elizabeth,	Spencer, . . .	Damage due to accident alleged to have occurred on State highway in Spencer.
Lemon, Solomon,	Spencer, . . .	Damage due to accident alleged to have occurred on State highway in Spencer.
McGee, John P.,	Marlborough, . . .	Damages due to construction of State highway in Marlborough.
Moran, James,	West Boylston, . . .	Damages due to construction of State highway in West Boylston.
Moran Mary E.,	West Boylston, . . .	Damages due to construction of State highway in West Boylston.
Paine, Sarah E.,	Revere, . . .	Damage due to accident alleged to have occurred on the State highway in Revere.
Parker, Frank C.,	Becket, . . .	Damage due to accident alleged to have occurred on the State highway in Becket.
Porter, Arthur T. and Yvonne.	Saugus, . . .	Damages due to construction of State highway in Saugus.
Proctor, George W.,	Gloucester, . . .	Damages due to construction of State highway in Gloucester.
Ray, Foster S.,	Charlton, . . .	Damages due to construction of State highway in Charlton.

STATEMENT OF CLAIMS AGAINST THE COMMISSION — *Concluded.*

NAME.	Residence.	Nature of Claim.
Roberts, William H., .	Gloucester, . .	Damages due to construction of State highway in Gloucester.
Robinson, Benj. A., .	Hingham, . .	Damages due to construction of State highway in Hingham.
Sampson, Frances A., .	Plymouth, . .	Damages due to construction of State highway in Plymouth.
Scott, Hugh C., . .	Norton, . .	Damages due to construction of State highway in Norton.
Snow, Frank E., . .	Wrentham, . .	Damages due to construction of State highway in Wrentham.
Taft, Kate P., . .	Northampton, .	Damages due to construction of State highway in Northampton.
Tribou, E. Harry, . .	Gloucester, . .	Damages due to construction of State highway in Gloucester.
Wade, Julia A., . .	Lee, . . .	Damages due to construction of State highway in Lee.
White, Emma A., <i>et al.</i> , .	Gloucester, . .	Damages due to construction of State highway in Gloucester.
York, Addie A., . .	Wrentham, . .	Damages due to construction of State highway in Wrentham.

APPENDIX G.

MAINTENANCE

Table showing the Amounts expended for Repairs and Maintenance, the Cost per Mile per Year for Each Road, the Number of Miles under Maintenance, and the Amounts to be assessed upon Municipalities for Maintenance under Chapter 47 of the Revised Laws.

Bedford, -	4,161,47	831,42	4,992,89	7,219,14	649,81	7,868,95	12,861,84	504,50	394,30	457,65	1,648
Bellchertown, -	4,617,58	499,48	5,114,06	3,985,72	1,145,60	5,131,32	10,249,38	154,73	1,589,63	252,29	3,228
Bellingham, -	4,673,46	551,59	5,325,05	6,927,79	862,17	7,789,96	13,115,01	173,01	1,744,36	295,12	3,180
Berkley, -	2,003,78	339,83	2,343,61	1,522,60	1,09,95	1,722,55	4,066,16	270,14	158,94	429,08	315,06
Bernardston, -	6,116,22	3,071,03	9,147,25	8,364,24	4,433,61	13,20,85	22,355,10	345,34	494,88	840,30	8,777
Beverly, -	54,190,11	2,182,84	56,668,95	151,957,82	7,357,63	159,315,45	215,934,40	310,30	1,295,13	1,605,43	2,223,62
Billerica, -	2,189,11	1,658,69	3,847,80	3,235,50	1,915,73	4,615,35	8,463,15	309,69	357,68	665,87	5,356
Blackstone, -	10,445,26	1,890,22	12,355,80	7,983,88	3,698,61	11,682,49	24,017,99	900,53	1,762,08	2,662,61	1,787,22
Blandstone, -	1,066,74	382,69	1,449,43	5,449,47	1,802,91	7,212,38	8,661,81	92,59	1,257,52	4,133	2,099
Boston, -	11,509,31	651,88	12,161,19	1,428,85	73,852,72	86,013,91	466,96	1,023,53	1,490,49	5,901,47	1,396
Bourne, -	16,618,58	1,140,12	16,758,70	42,566,91	4,313,05	48,789,99	63,638,69	88,63	335,28	423,91	12,864
Boxborough,	7,460,21	1,284,85	8,745,06	8,713,62	1,549,15	10,262,77	19,007,83	388,05	467,88	508,92	2,726,60
Braintree,	3,756,58	313,59	4,070,97	30,10,93	509,19	13,03,12	42,813,61	60,490,25	97,04	1,294,60	1,381,64
Brewster,	16,917,68	758,56	17,676,64	32,688,54	10,125,07	12,02,07	36,756,06	134,15	128,09	262,24	7,821
Bridgewater, -	7,968,79	611,73	8,580,52	27,591,45	584,09	28,175,54	22,430,44	131,32	313,87	445,19	721,98
Brinckton,	6,645,10	520,35	7,166,05	14,019,26	1,245,13	7,07,87	30,833,35	47,318,88	113,02	186,67	293,69
Brookfield,	16,057,18	428,35	16,485,53	10,125,87	30,125,87	30,125,87	46,690,36	419,19	584,56	737,12	3,967
Brookfield,	18,519,87	1,387,40	19,907,27	40,073,74	2,808,12	42,881,86	62,789,13	299,46	606,11	905,57	880,07
Buckland,	17,432,99	17,16,67	18,149,66	42,162,94	1,612,45	43,777,17	61,925,83	166,47	374,92	541,39	861,00
Burlington, -	9,887,99	2,762,34	12,620,33	8,239,29	2,624,14	10,863,43	23,433,76	727,12	690,74	1,417,86	4,305
Canton, -	12,501,42	1,283,07	17,784,49	45,841,83	8,235,04	67,861,87	67,861,36	396,99	2,547,97	2,944,96	3,799
Charlenton, -	13,506,44	2,370,33	15,885,77	17,876,01	8,212,67	26,078,68	41,984,45	688,87	884,44	843,95	11,922
Charlton, -	1,230,02	4,120,66	21,350,68	19,535,50	5,747,00	25,339,68	46,690,36	419,19	1,003,75	480,80	9,830
Chatham,	12,076,97	1,441,45	13,518,42	32,105,75	1,172,22	33,277,97	46,796,39	201,15	163,58	364,73	4,633
Chelmsford,	15,756,05	5,192,07	20,948,12	5,454,20	25,265,95	46,213,67	722,32	753,80	1,475,12	548,33	7,188
Chelsea, -	7,774,17	1,175,89	8,950,06	19,488,13	5,712,05	20,160,08	29,110,14	1,226,16	752,82	1,978,98	1,207,94
Cheshire, -	15,987,96	1,401,07	17,389,03	9,663,55	5,531,58	5,531,58	5,531,58	829,32	1,039,38	434,92	3,335
Chester, -	17,632,45	3,039,11	20,691,56	2,006,17	28,842,15	49,533,71	459,36	303,23	762,99	6,616	6,616
Chiocope,	26,600,03	1,663,07	28,272,10	50,839,91	774,85	51,614,76	79,886,86	420,60	195,97	616,57	1,354,84
Chilmark,	7,120,39	2,039,92	3,150,68	19,535,50	5,747,00	16,473,27	25,663,58	261,90	957,19	1,219,09	3,954
Clarksburg,	5,328,42	980,68	6,309,10	4,879,58	1,925,01	6,804,59	13,113,69	340,99	669,34	333,60	389,45
Cohasset, -	7,967,97	433,47	8,401,44	24,303,63	18,884,80	43,188,43	51,589,87	190,12	8,282,81	8,472,93	2,876,75
Colrain, -	4,446,45	333,12	4,779,57	2,918,63	989,55	3,908,55	8,687,16	156,17	463,91	626,29	2,280
Concord, -	20,226,74	2,311,76	22,538,50	25,604,29	89,808,25	115,412,54	137,951,04	551,73	21,433,96	2,095,85	3,378,07
Conway, -	-	881,02	881,02	881,02	-	-	-	443,99	443,99	443,99	2,133
Dalton, -	11,729,01	276,71	12,005,72	7,870,96	2,172,54	10,043,50	22,049,22	108,22	849,64	937,86	4,190
Danvers, -	20,272,33	883,19	290,42	124,81	4,437,77	1,66,55	4,569,00	120,39	63,34	182,73	301,97
Dartmouth, -	15,144,89	1,285,31	16,430,20	77,055,76	14,383,77	91,475,53	107,099,73	271,45	3,037,75	3,370,45	3,635,52
Dedham, -	2,156,18	896,71	3,052,88	3,887,92	1,637,81	5,525,73	8,578,61	380,93	6,076,69	3,384,88	1,267,52
Deerfield, -	30,807,25	2,092,41	32,899,66	61,404,28	7,681,43	69,085,71	101,955,37	188,96	693,71	882,67	857,12
Dennis, -	25,059,73	831,82	25,31,55	37,175,67	1,892,86	39,06,53	65,000,08	110,94	252,45	363,29	1,073
Dighton, -	6,816,76	497,73	7,314,49	44,217,06	2,999,21	47,216,27	54,530,76	81,50	491,11	572,61	8,107

Table showing the Amounts expended for Repairs, Maintenance, etc.—Continued.

TOWN OR CITY.	AMOUNTS EXPENDED.						EXPENDED PER MILE IN 1919.					
	REVENUE APPROPRIATION.			MOTOR VEHICLE FEES FUND.			EXPENDED			PER MILE IN 1919.		
	Totals to 1919.	During 1919.	Total.	Totals to 1919.	During 1919.	Total.	From Revenue Appropriation.	From Motor Vehicle Fees Fund.	Total.	Cost per Mile per Year.	Length under Maintenance (Miles).	Amounts to be assessed on Cities and Towns.
Douglas,	\$5,963 45	\$466 90	\$6,430 35	\$10,389 31	\$1,991 94	\$11,381 25	\$219 72	\$466 80	\$685 52	2,125	\$425 00	
Draeven,	6,625 15	879 77	6,304 22	4,226 44	6,002 21	5,656 96	403 16	814 20	2,171 36	2,181	436 20	
Draeven,	5,119 18	1,245 94	6,365 12	4,591 32	3,244 63	7,835 97	14,201 07	568 93	787 40	5,703	1,440 50	
Dudley,	9,471 00	707 04	10,181 04	12,244 98	2,388 72	14,633 70	24,814 74	221 92	749 76	971 68	7,637 20	
Duxbury,	12,733 55	366 60	13,100 15	35,939 50	14,508 22	50,448 17	63,548 32	41 11	1,627 03	1,668 14	7,783 40	
East Bridgewater,	301 95	277 23	579 18	682 97	161 42	22,740 60	73 61	131 34	254 95	6,962 83	3,766 08	
East Longmeadow,	5,115 83	1,457 67	6,573 50	6,800 22	1,300 33	8,100 55	14,674 05	810 27	722 81	1,533 08	661 26	
Easthampton,	9,949 06	612 16	10,361 22	17,224 55	6,163 92	18,827 67	29,398 89	94 76	249 71	6,460	323 00	
Easthampton,	7,905 05	8,205 81	19,659 72	6,895 92	11,659 72	26,565 67	34,761 48	2,18 61	2,628 13	651 62	3,597 00	
Easton,	518 88	518 43	6,498 76	21,863 09	358 46	22,291 55	27,193 45	73 26	447 52	520 78	2,738	
Edgartown,	6,180 33	121 07	1,915 99	8,414 75	120 55	49 26	178 81	188 41	2,458	160 75		
Egremont,	647 25	574 32	1,221 57	8,668 03	1,485 70	10,153 73	11,375 30	345 83	479 52	1,258 61	2,496 80	
Elbridge,	16,820 09	802 26	17,484 36	8,030 67	3,793 54	52,599 21	70,083 57	98 77	467 01	565 78	812 30	
Emmetsburg,	5,793 13	431 72	6,224 85	4,073 26	1,088 17	5,161 43	11,308 28	296 31	746 86	1,043 17	905 76	
Fairhaven,	2,534 81	333 69	2,868 50	19,260 99	2,245 46	21,506 45	24,374 95	89 53	602 48	692 01	1,457 00	
Fall River,	11 86	77 66	80 30	13 20	50 81	117 11	275 81	306 98	582 79	736 54	1,277 50	
Falmouth,	35,738 16	2,489 90	37,928 06	82,031 65	3,161 67	85,193 32	123,121 38	41 04	244 66	524 66	1,043 12	
Fitchburg,	71 88	15,821 83	81,210 40	4,485 34	8,693 74	10,515 57	17 45	1,039 25	1,066 65	1,019 05	15,527 78	
Florida,	13,837 05	3,525 10	17,362 15	20,389 17	14,095 55	34,484 76	51,846 91	487 23	1,948 25	1,410 80	7,235 80	
Oxfordborough,	6,495 38	938 89	7,434 47	17,455 75	7,407 84	24,863 59	32,298 06	2,108 09	2,375 28	616 28	3,514 70	
Prammington,	11,539 32	232 94	13,563 26	9,500 73	2,515 36	12,025 34	16,588 35	725 10	787 82	1,509 92	2,419 65	
Franklin,	8,002 08	898 81	8,900 89	7,813 16	1,820 18	9,633 34	18,534 23	238 85	483 70	722 55	511 37	
Freemont,	511 45	8,227 57	48,598 81	47,986 96	49,385 77	56,163 34	132 20	203 40	335 60	969 46	3,869 90	
Gardiner,	7,716 09	10,132 47	41,365 25	1,945 61	43,310 86	53,443 33	110 26	570 74	690 41	770 06	1,158 49	
Gay Head,	2,352 79	1,067 25	3,420 04	2,471 57	2,965 93	2,768 50	6,188 54	340 54	94 79	405 38	3,134 70	
Hill,	71 50	71 50	1 12	—	—	—	—	—	—	40 23	284	
Holyoke,	51,427 37	1,791 44	53,218 81	38,775 23	2,715 16	41,490 74	94,709 20	265 40	402 25	667 65	1,139 21	
Loshen,	9,155 17	6,67 32	9,222 49	17,481 21	1,076 44	18,557 65	27,780 14	27 37	437 58	464 93	2,460 00	
Granby,	15,587 72	2,361 16	17,948 88	1,227 86	5,945 16	17,213 36	38,122 24	246 52	767 27	503 06	9,573 00	
Grantham,	13,323 94	771 90	14,115 84	8,154 61	3,341 12	11,495 73	25,611 57	434 70	537 73	355 06	7,686 30	
Great Barrington,	17,443 16	1,260 46	18,693 62	37,425 90	3,836 28	41,462 47	59,475 59	671 21	777 28	5,698 00	2,568 72	
Groton,	8,681 00	332 03	9,013 83	31,031 37	7,588 23	38,619 65	47,633 48	1,443 00	1,443 00	677 46	5,451 00	
Groton,	253 66	5,957 03	3,980 37	11,490 41	5,563 06	5,633 38	11,490 41	1,025 12	1,025 12	474 85	3,900 00	

Groveland,	5,847 95	6,232 27	5,509 77	1,710 18	13,452 22	7,219 95	1,115 61	892 56	1,723
Hadley,	19,573 96	20,629 45	46,334 81	1,489 76	47,874 57	68,594 02	125 05	317 65	172 30
Hamilton,	1,460 85	1,327 75	7,608 75	47,655 06	55,263 81	69,067 48	15,337 64	4,690	938 00
Hancock, .	48,299 67	556 69	48,866 36	26,810 66	80,221 66	107,023 32	155,889 68	24,818 27	1,680 27
Hanover, .	3,987 07	4,074 49	4,394 55	10,558 69	2,284 49	12,855 18	17,247 74	725 07	620 20
Harvard,	3,018 47	3,213 40	194 93	1,321 40	2,727 65	2,708 80	5,922 20	238 46	24,993 61
Hardwick,	4,494 55	748 40	5,242 95	5,302 14	1,648 32	6,950 46	12,193 41	323 14	835 68
Harvard,	13,086 04	650 94	13,736 05	36,302 90	2,143 33	39,046 23	52,783 21	100 50	2,315 42
Harwich, .	7,988 51	145 50	8,134 01	58,312 65	11,736 59	70,079 24	78,213 25	10 10	2,356 52
Hathfield, .	2,668 68	24,750 08	27,418 76	11,329 36	4,365 36	15,694 46	43,113 22	466 88	1,230 54
Haverhill,	9,540 11	357 55	9,897 66	42,446 33	5,117 72	47,564 05	57,461 71	91 35	5,716 89
Hingham,	2,264 92	30 88	1,707 15	5,94 52	2,381 67	4,677 54	1,398 89	3,914	3,156 89
Hinsdale,	4,153 22	4,364 40	22 18	5,922 50	6,85 72	6,608 22	82 43	1,264 47	605 11
Holbrook,	2,111 90	2,564 68	20,452 78	2,717 43	2,678 32	2,852 75	47,417 43	303 91	838 65
Holden, .	629 52	7,638 73	6,673 73	1,610 90	8,290 63	15,929 33	127 15	455 00	1,381 45
Holliston,	7,009 23	826 61	9,017 15	40,663 50	4,081 66	44,745 16	53,732 31	198 37	979 52
Holyoke, .	8,190 54	-	55 48	237 84	140 87	375 71	434 19	445 70	1,177 89
Hudson, .	3,010 61	379 02	3,389 63	1,904 95	897 00	2,801 95	6,914 58	91 91	4,167 13
Huntington,	13,149 75	2,329 95	15,479 70	11,455 86	2,494 96	13,980 82	29,460 52	290 70	1,175 13
Ipswich, .	17,603 55	1,497 44	19,000 99	20,323 60	53,94 88	52,271 56	93,222 57	338 71	12,202 66
Kingston, .	2,613 81	138 36	2,752 17	3,666 74	2,054 12	5,720 86	8,473 03	54 49	809 03
Lakeville,	8,153 65	324 45	8,978 10	47,225 92	1,45 18	57,610 20	98 62	267 90	863 52
Lancaster,	4,183 90	742 10	4,936 00	3,509 64	934 44	4,444 08	9,380 08	594 16	1,342 31
Lanesborough,	4,744 82	654 55	5,399 27	3,926 64	854 14	4,780 77	10,180 04	285 79	437 13
Lawrence,	5,847 94	6,312 53	7,289 50	21,081 10	27,891 60	29,113 63	573 57	977 28	586 78
Lee, .	34,487 18	1,980 12	36,442 18	20,508 99	3,809 33	26,615 82	66,045 26	183 26	1,550 85
Leicester, .	43,654 70	2,181 39	45,836 09	63,639 88	4,949 77	68,639 65	114,475 74	450 14	539 54
Lenox, .	52,772 45	2,644 56	55,417 03	49,432 22	3,818 71	53,270 93	108,687 96	345 11	1,021 41
Leominster,	23,628 08	1,146 49	24,774 57	110,152 31	2,676 10	1,745 18	6,979 58	15,836 64	498 34
Lexington,	11,636 75	133 52	11,820 27	66,271 94	2,045 59	112,855 41	137,632 98	247 94	1,147 56
Lincoln, .	10,104 20	3,967 98	14,072 18	30,873 42	1,356 92	2,506 92	19,031 05	45,351 38	966 91
Littleton,	24,531 70	1,787 73	26,319 43	{ 16,535 03	1,661 24	3,018 16	3,018 16	646 62	7,663 52
Lowell (east),	19,504 16	1,785 10	21,289 26	{ 46,663 23	7,533 33	75,485 82	80,137 58	64 82	1,147 56
Lowell (south),	13,753 12	866 40	14,569 52	{ 10,790 83	2,573 31	13,364 54	27,934 06	663 65	1,057 82
Marlborough,	2,275 07	94 75	2,634 37	{ 2,262 01	4,745 36	5,731 84	5,731 84	570 11	1,412 91
Marion, .	17,550 77	555 85	18,136 62	{ 59,997 62	2,485 54	62,482 16	65,696 00	80,619 78	2,640 39
Marlborough,	38,302 44	1,479 55	39,981 99	{ 159,388 90	165,084 90	205,066 89	211 91	815 81	6,546 48
Marshfield,	15,959 64	435 60	16,395 24	{ 50,781 74	35,023 56	85,805 30	102,200 54	52 63	4,231 43

Table showing the Amounts expended for Repairs, Maintenance, etc.—Continued.

TOWN OR CITY.	AMOUNTS EXPENDED.				EXPENDED PER MILE IN 1919.				Length under Maintenance (Miles).	Amounts to be assessed on Cities and Towns.		
	REVENUE APPROPRIATION.		MOTOR VEHICLE FEES FUND.		From Revenue Appropriation.		Cost per Mile per Year.					
	Totals to 1919.	During 1919.	Total.	Totals to 1919.	During 1919.	Total.	From Motor Vehicle Fees Fund.	Total.				
Mashpee,	\$1,671.85	\$745.31	\$2,417.16	\$3,415.30	\$922.03	\$4,337.32	\$6,754.49	\$115.50	\$213.65	\$390.20		
Mattapoisett,	9,550.46	371.78	9,922.24	61,935.87	1,164.45	63,100.56	115.56	363.21	1,133.26	320.60		
Medfield,	3,150.07	218.89	3,368.96	19,193.89	549.68	19,713.57	23,112.53	253.93	2,353.14	384.28		
Melrose,	1,569.47	288.20	1,857.67	2,205.30	2,262.06	2,065.55	3,023.22	507.39	1,414.59	545.84		
Mendon,	—	202.43	—	391.14	2,205.30	2,596.44	218.14	421.49	639.63	502.67		
Merrimac,	7,205.97	546.94	7,752.91	4,095.54	1,885.15	5,980.69	13,733.60	245.15	844.98	1,000.13		
Methuen,	25,205.68	1,640.76	26,846.44	74,559.15	3,448.73	78,008.42	104,354.86	210.43	442.31	632.74		
Middleborough,	26,072.01	1,020.41	27,692.42	37,657.15	18,266.59	105,923.74	133,616.16	82.01	1,468.02	1,301.68		
Middleton,	233.46	1,393.80	2,339.05	2,339.05	3,047.40	4,441.20	87.93	266.80	354.73	651.88		
Millbury,	6,014.58	517.04	6,531.62	8,029.71	1,530.04	10,159.75	16,691.37	145.81	431.48	577.29		
Millville,	18,296.12	993.94	19,290.06	50,851.91	1,996.68	52,848.59	72,138.35	333.42	669.80	1,003.22		
Milton,	1,565.83	817.11	2,382.94	1,680.24	1,967.48	3,647.72	6,030.66	501.29	1,207.04	1,708.33		
Monson,	4,864.16	214.21	5,028.27	13,846.77	14,270.17	14,270.93	22,318.20	202.66	399.40	602.23		
Montague,	11,915.09	993.14	12,908.23	45,889.54	4,783.18	2,067.72	7,096.39	101.86	397.95	225.93		
Nantucket,	18,615.07	2,140.23	20,755.30	45,551.74	1,730.55	4,232.29	57,190.52	173.32	302.02	475.34		
Natick,	14,581.46	641.88	15,223.34	78,637.37	3,367.98	13,200.80	33,956.91	331.05	520.96	852.01		
Needham,	5,946.58	402.45	6,319.03	14,184.31	1,380.76	9,364.12	95,567.46	200.34	538.94	739.28		
New Braintree,	535.63	1.75	537.39	270.39	40.92	5,545.07	11,894.10	197.76	668.68	881.60		
Newbury,	17,670.94	1,449.43	19,120.37	13,861.07	2,988.67	16,859.74	35,980.11	342.57	708.74	1,051.31		
Newburyport,	11,999.45	716.05	12,715.50	5,541.75	4,301.93	9,813.68	22,559.18	322.55	1,937.81	2,260.36		
New Marlborough,	123.95	85.81	206.76	89.08	102.98	192.06	401.82	373.09	447.74	820.83		
Newton,	2,057.56	1,932.51	3,990.07	16,952.28	1,128.49	18,050.77	22,070.84	1,872.59	1,093.50	2,966.09		
Norfolk,	6,093.07	55.337.86	6,163.90	13,979.94	3,707.57	14,350.51	20,514.41	48.98	256.27	492.25		
North Adams,	11,019.41	3,780.75	59,698.61	93,136.05	11,478.83	104,614.88	164,313.49	463.26	1,414.00	1,877.26		
Northampton,	16,927.59	2,230.75	19,157.96	10,777.08	3,943.25	14,720.33	57,693.50	109.67	186.28	295.95		
North Andover,	10,948.07	382.75	11,330.82	49,830.75	5,233.65	52,360.97	63,691.79	33.87	210.33	371.86		
North Attleborough,	19,238.16	549.43	19,787.50	70,987.59	3,992.64	74,980.23	94,767.82	102.51	744.90	807.78		
Northborough,	749.00	324.10	1,073.19	1,579.34	674.52	2,253.56	3,327.05	97.24	202.38	847.41		
Northbridge,	3,595.74	608.49	4,204.23	2,998.52	1,308.92	4,307.44	8,511.47	270.20	581.23	851.43		
North Brookfield,	6,361.83	366.80	6,728.63	16,650.49	2,993.74	19,644.23	26,372.86	85.74	699.80	846.18		
North Reading,	19,942.60	739.91	20,682.51	64,925.15	1,341.00	66,266.15	86,948.66	291.53	528.37	819.90		

Norton,	-	10,089 47	1,154 68	11,244 15	10,432 30	3,692 73	14,125 03	25,369 18	151 51	484 55	636 06	7,621	
Norwood,	-	12,774 78	13,274 48	24,544 02	1,842 77	26,336 79	39,661 27	1,103 37	868 00	1,103 37	871 48	1,171 23	
Oak Bluffs,	-	9,732 95	386 62	10,179 57	5,173 12	5,00 50	5,673 62	15,853 19	161 97	371 65	283 12	1,443 56	
Oakham,	-	496 26	496 12	1,040 92	3,203 62	4,244 54	48,235 64	5,149 92	1,147 43	1,328 12	2,792 12	139 60	
Orange,	-	19,738 14	680 67	20,418 81	59,666 29	3,119 35	62,735 64	83,204 45	141 95	650 54	792 49	959 00	
Orleans,	-	9,284 41	407 63	9,632 04	16,190 59	4,442 66	16,633 25	26,325 29	867 71	94 22	190 99	363 24	
Oxford,	-	6,685 34	874 95	7,560 29	5,356 23	2,157 43	12,267 52	139,891 99	15,673 95	195 61	677 93	449 81	4,698
Palmer,	-	42,318 73	3,643 58	45,982 31	12,624 47	14,287 61	185,854 30	253 33	991 97	1,245 30	1,309 78	14,383	8,955 55
Paxton,	-	24,624 58	1,888 78	26,523 36	20,392 02	1,486 88	21,888 90	48,411 26	527 88	416 15	944 03	594 33	3,597
Pepperell,	-	3,407 14	3,628 11	4,108 24	3,718 68	5,233 03	2,966 59	8,123 04	50 86	80 00	139 86	390 87	4,345
Peterborough,	-	3,557 73	180 97	3,628 11	4,108 24	3,718 68	5,233 03	8,199 62	11,916 30	50 59	829 35	879 94	303 83
Petersham,	-	248 40	-	248 40	3,265 59	3,265 59	3,265 81	3,514 21	30 34	398 00	429 24	505 96	3,557
Phillipston,	-	24,716 19	312 88	25,029 07	27,738 55	1,954 63	29,723 18	54,722 25	11,2 61	824 95	1,283 10	2,785	139 25
Pittsfield,	-	57,263 70	2,322 43	59,586 13	72,534 26	5,504 58	78,038 84	137,624 97	256 54	608 04	864 53	1,169 77	9,053
Plainville,	-	4,327 91	212 88	5,450 79	22,335 40	212 88	26,170 26	79,761 02	92 84	320 45	413 32	2,293	229 30
Plymouth,	-	19,369 13	930 76	20,299 89	73,737 33	2,387 61	100,060 91	61 09	166 97	232 06	579 53	14,300	1,659 23
Princeton,	-	4,552 61	40 00	4,502 61	5,145 45	1,562 07	6,737 52	11,330 13	17 94	713 93	731 87	286 19	2,230
Provincetown,	-	3,520 48	687 52	4,208 00	14,646 17	15,62 34	19,370 34	18,907 34	18 90	307 04	496 88	830 99	2,630
Quincy,	-	9,377 27	690 30	10,067 57	25,090 65	26,988 96	52,079 61	62,147 18	258 06	10,089 33	10,347 39	1,536 17	3,675
Randolph,	-	3,346 68	472 60	3,819 28	11,267 34	34,763 97	46,301 31	49,850 59	127 39	9,370 34	9,497 73	1,433 72	742 00
Raynham,	-	3,979 42	801 37	4,750 79	10,805 84	12,069 89	12,015 73	16,796 52	141 76	214 03	355 79	374 07	5,653
Reading,	-	39,399 74	962 67	40,362 36	52,452 42	2,013 96	54,466 38	94,826 74	245 38	513 37	758 75	1,496 64	3,923
Rehoboth,	-	14,628 71	917 37	15,546 08	56,423 47	3,548 99	56,518 71	75,518 54	140 14	542 16	682 30	762 42	6,546
Revere (west),	-	746 16	{ 1,657 01	17,155 85	{ 35,829 58	{ 487 54	{ 36,317 12	{ 38,976 30	{ 329 76	594 05	923 81	2,877 21	5,025
Revere (north),	-	1,004 17	13,748 51	1,777 16	23,232 45	3,355 99	26,588 44	35,378 81	{ }	210 36	835 45	1,045 81	2,321 05
Richmond,	-	7,945 37	845 00	8,790 37	10,749 25	6,490 44	30,325 36	41,074 61	{ }	85 29	1,051 93	1,137 22	525 19
Rochester,	-	10,223 00	526 25	882 07	6,571 90	1,453 97	3,448 87	3,747 71	{ }	1,052 49	522 49	445 11	4,017
Rockland,	-	7,518 46	1,832 00	9,370 76	13,100 99	281 13	4,116 92	13,487 68	{ }	1,157 69	175 71	1,333 40	617 00
Rockport,	-	11,225 58	1,409 20	12,634 78	9,440 90	4,425 22	98,832 12	111,466 90	{ }	1,218 06	1,605 95	2,925 49	320 97
Rowley,	-	36,408 71	2,488 92	38,897 63	40,648 88	5,221 30	45,870 18	84,757 81	{ }	537 17	793 23	550 96	363 30
Russell,	-	2,756 23	1,263 43	4,019 66	8,351 12	1,239 49	9,70 61	13,730 27	{ }	245 00	472 69	602 80	5,544 90
Rutland,	-	19,219 08	688 24	19,907 32	10,023 96	2,165 91	12,189 87	32,097 19	{ }	654 35	862 28	1,320 55	614 97
Salem,	-	10,205 01	969 29	11,174 30	47,380 44	7,118 98	54,509 42	65,683 72	{ }	718 87	816 75	900 23	3,903
Salisbury,	-	11,689 40	840 37	12,539 77	20,413 09	8,110 08	28,523 17	41,062 94	{ }	88 27	851 90	459 19	952 00
Sandwich,	-	1,141 01	17,433 65	68,123 12	7,175 33	70,226 10	87,660 10	93,660 10	{ }	387 89	1,218 06	3,633	1,668 17
Saugus,	-	16,292 64	3,496 53	627 35	4,123 88	5,380 69	7,173 40	11,387 97	{ }	346 60	985 30	1,331 00	1,241 87
Savoy,	-	13,358 37	306 12	13,664 49	46,414 99	1,225 12	47,640 11	61,304 60	{ }	56 95	227 97	765 12	5,374
Sciutate,	-	10,437 76	1,501 51	19,139 27	35,805 05	19,112 21	54,917 26	66,536 53	{ }	249 05	3,419 10	955 46	6,029
Sharon,	-	911 51	140 05	1,051 56	2,052 20	1,128 20	2,177 76	21,95 51	{ }	611 75	392 24	611 75	1,205 80
Sheffield,	-	5,104 03	2,266 10	7,370 13	8,283 67	5,038 26	13,321 93	20,692 06	{ }	196 95	437 96	634 94	1,150 40

Table showing the Amounts expended for Repairs, Maintenance, etc.—Concluded.

TOWN OR CITY.	AMOUNTS EXPENDED.			EXPENDED PER MILE IN 1919.			Length under Maintenance (Miles).	Cost per Mile per Year.	Amounts to be assessed on Cities and Towns.	
	REVENUE APPROPRIATION.			From Revenue Appropria-						
	Totals to 1919.	During 1919.	Total.	Totals to 1919.	During 1919.	Total.	From Motor Vehicle Fees Fund.	Total.		
Shelburne,	\$12,162 85	\$1,464 69	\$13,627 54	\$17,824 63	\$4,971 55	\$22,796 18	\$36,423 72	\$755 21	\$724 89	
Shirley,	48,791 15	497 99	2,196 60	526,000 72	1,170 92	2,696 92	523 63	320 93	3,116 60	
Shrewsbury,	1,231 82	50,022 97	94,480 97	3,016 62	97,500 32	147,530 31	253 77	621 47	3,61 80	
Somerset,	19,943 08	2,017 18	21,950 26	114,951 65	5,131 29	120,082 94	142,043 20	203 37	1,503 24	
Somerville,	7,061 01	2,350 63	7,411 64	43,121 88	612 48	43,734 36	51,146 00	221 50	725 24	
Southampton,	1,202 57	110 08	1,312 65	575 67	1,155 39	2,468 04	155 48	974 29	708 40	
Southborough,	8,093 22	1,016 84	9,110 06	6,964 35	2,042 11	9,066 46	18,116 52	553 27	828 76	
Southbridge,	4,035 46	230 21	4,265 67	7,936 68	815 57	7,852 25	12,117 92	770 66	406 61	
South Hadley,	51,500 76	1,584 43	53,085 19	47,925 04	3,082 34	51,007 38	104,092 57	219 95	568 44	
Spencer,	22,391 48	1,233 30	23,624 78	19,331 87	1,854 47	21,786 34	45,411 12	403 17	770 54	
Sterling,	13,614 72	1,544 57	15,189 20	9,154 20	2,929 00	12,083 30	27,272 59	606 23	1,322 34	
Stockbridge,	11,764 47	830 14	12,594 61	24,883 62	1,944 45	26,838 07	39,432 68	195 19	548 36	
Stoneham,	10,694 33	871 15	11,565 47	27,350 37	1,668 94	29,019 31	40,880 46	743 88	995 72	
Stoughton,	8,857 13	495 65	9,352 78	25,403 46	13,475 92	38,787 88	48,231 66	89 13	1,708 84	
Sturbridge,	5,325 19	1,158 82	6,684 01	8,499 22	1,809 90	10,310 12	16,394 13	492 36	2,423 20	
Sudbury,	34,730 83	888 26	35,619 09	151,181 97	4,885 81	156,066 98	191,686 07	769 61	807 77	
Sunderland,	4,834 19	568 69	5,492 88	21,808 92	3,105 01	24,913 93	30,116 92	1,129 07	501 86	
Sutton,	7,502 25	1,359 33	8,861 58	10,940 10	2,800 10	13,740 20	22,601 78	596 20	1,228 11	
Swampscott,	22,394 40	411 28	22,810 68	20,123 98	1,039 66	21,183 64	43,994 32	275 84	1,824 31	
Swansea,	14,356 52	1,226 03	15,582 55	54,256 45	8,330 23	62,686 68	78,269 23	129 60	986 54	
Taunton,	17,586 88	1,910 92	19,497 80	3,404 37	67,488 90	86,986 70	224 39	880 57	1,010 17	
Templeton,	13,610 32	1,183 37	14,793 60	38,236 30	4,506 37	42,862 67	57,655 36	208 05	634 15	
Tewksbury,	17,722 86	594 87	18,317 73	11,782 89	37,274 56	155,147 45	173,465 18	96 16	702 26	
Tisbury,	5,108 61	866 87	5,975 48	21,870 21	5,975 98	23,663 19	450 09	1,025 63	1,025 63	
Townsend,	11,810 38	399 33	12,209 71	21,535 72	5,497 17	27,032 80	39,242 67	616 16	911 03	
Truro,	10,827 42	582 62	11,410 04	10,119 10	2,591 62	12,710 72	24,120 76	416 40	977 19	
Tynshborough,	18,639 42	—	19,690 69	20,690 11	22,391 53	37,131 18	46,824 82	539 36	353 70	
Upton,	590 25	590 25	—	—	—	407 18	997 43	169 03	826 20	
Uxbridge,	7,759 76	1,248 43	9,008 19	10,703 65	2,940 51	13,644 16	22,652 35	259 28	826 20	
								610 70	392 08	

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Wales,	1,654 57	521 31	2,175 88	641 27	720 67	2,896 55	501 26	577 61	1,040
Walpole,	19,497 55	701 32	12,223 35	54,577 67	2,462 74	57,040 41	77,239 28	76 35	52 00
Ware,	11,548 17	675 18	24,488 49	6,363 31	2,346 08	8,719 30	20,932 68	132 90	592 03
Watnham,	22,647 69	1,840 80	22,125 96	62,647 82	26,184 37	88,332 19	113,320 68	161 68	1,527 17
Wattn,	20,880 65	1,245 34	22,184 39	72,820 70	119,005 92	114,131 08	252 09	14,741 03	751 00
Watertown,	7,921 14	427 82	8,348 96	11,049 30	593 62	11,642 92	19,991 88	503 32	599 59
Wayland,	42,238 05	348 28	42,586 33	38,061 13	927 68	38,388 81	81,575 14	698 38	723 48
Webster,	4,448 98	259 04	4,407 98	1,121 33	1,408 27	12,621 67	17,029 65	1,290 60	2,290 02
Welllesley,	5,401 23	455 95	5,857 18	17,684 76	653 21	18,337 97	24,195 15	387 71	963 55
Wenfleet,	11,042 18	598 43	11,640 61	9,116 34	1,499 43	10,156 77	22,256 38	203 56	1,176 17
Wenham,	12,935 72	414 16	13,349 88	18,066 85	2,150 33	20,217 18	33,567 68	1,201 07	1,510 63
Westborough,	5,834 95	832 43	6,667 43	4,937 82	1,870 43	6,308 25	13,475 68	625 35	1,510 63
West Boylston,	10,287 44	424 50	41,345 90	1,884 01	1,884 01	53,229 91	53,994 85	903 88	1,510 63
West Bridgewater,	21,827 52	450 83	22,728 34	8,388 94	8,715 85	30,994 10	142 62	437 84	1,510 63
West Brookfield,	17,158 89	954 35	18,113 24	19,915 04	25,003 60	44,918 64	63,031 88	103 43	246 05
Westfield,	2,340 51	340 51	2,340 51	2,340 51	2,340 51	2,340 51	337 35	8,888 32	9,175 76
Westford,	11,989 51	1,708 58	13,698 53	10,082 81	2,888 27	12,971 89	81,807 60	403 20	1,124 77
Westminster,	24,937 27	4,797 89	29,735 16	66,481 52	9,615 64	76,997 16	105,832 32	598 02	1,186 51
West Newbury,	22,143 04	876 52	23,019 56	12,158 92	4,208 05	16,336 97	39,366 53	824 30	1,001 67
Weston,	24,389 03	487 59	24,876 62	40,617 88	1,523 58	42,141 46	67,018 08	154 69	996 00
Westport,	36,157 35	1,446 90	37,604 25	5,275 55	853 08	55,284 63	92,732 88	303 27	1,063 71
West Springfield,	11,076 55	433 73	11,510 28	49,594 77	759 49	51,864 54	160 40	178 81	1,152 67
West Tisbury,	4,536 49	1,218 98	5,754 57	16,733 55	2,656 80	19,030 35	24,785 82	227 51	485 61
Westwood,	12,564 71	323 65	12,888 39	13,109 14	1,467 61	14,576 75	27,465 14	232 19	1,370 32
Whately,	31,150 55	1,263 57	32,413 77	50,041 66	38,317 98	89,350 64	121,731 41	138 58	1,672 65
Whitman,	15,223 45	618 16	15,841 61	38,177 66	9,412 38	47,360 14	63,354 54	2,337 90	4,342 42
Wilbraham,	6,319 21	230 13	6,549 34	17,368 47	84 80	17,463 27	24,002 61	57 68	2,491 44
Williamsburg,	25,584 90	1,184 21	26,769 11	97,735 95	1,715 04	99,450 99	126,220 10	234 27	424 36
Wilmot,	8,528 50	106 48	8,624 98	27,674 73	4,789 99	32,464 74	41,099 72	39 73	573 55
Williamstown,	14,391 57	319 64	14,711 21	42,668 65	1,194 41	45,862 06	58,557 27	1,782 31	1,387 94
Wilmington,	4,896 34	495 62	5,391 96	7,471 73	13,049 36	20,521 09	25,913 05	114 36	1,827 04
Winchendon,	7,994 08	4,580 88	12,574 96	20,037 02	9,339 63	29,376 65	41,951 61	126 74	3,547 75
Winchester,	10,279 09	1,146 79	11,325 88	12,784 41	2,315 15	15,099 56	26,525 44	1,186 04	1,289 40
Windsor,	2,556 13	4 60	2,560 73	4,235 63	674 03	4,909 56	7,470 29	94 47	1,177 53
Woburn,	10,088 49	1,876 88	11,965 37	8,040 23	3,461 79	11,511 02	23,476 39	342 12	1,138 41
Worcester,	31,437 98	1,449 67	32,887 65	70,129 44	3,763 99	73,803 13	106,780 75	356 01	1,280 36
Wrentham,	16,395 85	1,227 39	17,23 24	54,806 18	8,780 90	63,587 08	81,310 32	922 65	1,062 13
Yarmouth (south),	21,783 97	607 70	22,393 67	39,917 32	51,159 33	73,553 00	69 07	1,277 79	1,346 86
Yarmouth (south),								366 38	8,798 38
								1,277 79	1,759 60

APPENDIX H.

STATEMENT SHOWING THE NUMBER OF PETITIONS RECEIVED AND THE LENGTH PETITIONED FOR, THE LAYOUTS MADE AND THEIR LENGTH AND DISTRIBUTION IN THE VARIOUS COUNTIES OF THE COMMONWEALTH.

COUNTIES.	PETITIONS RECEIVED.				PETITIONS SITUATED IN —			LAYOUTS MADE IN —			Number of Layouts.	
	County.	City.	Town.	Totals.	City.	Town.	Totals.	City.	Town.	Totals.		
					County.	City.	Town.	County.	City.	Town.		
Barnstable, . . .	4	—	59	93	—	15	15	—	15	15	134	
Berkshire, . . .	18	12	62	92	2	30	32	2	20	22	145	
Bristol, . . .	5	8	54	67	3	18	21	3	16	19	129	
Dukes, . . .	3	—	6	9	—	6	6	—	6	6	29	
Essex, . . .	10	27	62	99	7	26	33	8	19	27	166	
Franklin, . . .	2	—	63	65	—	18	18	—	16	16	115	
Hampden, . . .	4	6	36	46	3	17	20	2	12	14	92	
Hampshire, . . .	2	7	54	63	1	17	18	1	13	14	98	
Middlesex, . . .	18	29	113	160	10	44	54	8	35	43	214	
Nantucket, . . .	—	—	1	1	—	1	1	—	1	1	14	
Norfolk, . . .	4	7	76	87	1	26	27	1	23	24	117	
Plymouth, . . .	—	8	70	78	1	25	26	1	21	22	155	
Suffolk, . . .	—	8	2	10	3	1	4	3	—	3	10	
Worcester, . . .	1	9	172	182	3	56	59	3	49	52	306	
Totals, . . .	71	121	830	1,022	34	300	334	32	246	278	1,724	

NUMBER OF PETITIONS RECEIVED, ETC. — *Concluded.*

COUNTIES.	LENGTHS PETITIONED FOR.		LENGTHS LAID OUT.					
	1894-1918.		1919.		TOTALS.			
	Feet.	Miles.	Feet.	Miles.	Feet.	Miles.	Feet.	Miles.
Barnstable, . . .	834,939	158.13	673,599	127.575	29,475	5.582	703,074	133.157
Berkshire, . . .	991,018	187.69	622,981	117.978	55,394	10.492	678,375	128.480
Bristol, . . .	900,264	170.51	483,854	91.630	11,174	2.116	495,028	93.746
Dukes, . . .	155,363	29.43	121,631	23.033	—	—	121,631	23.030
Essex, . . .	1,262,797	239.15	535,445	101.410	23,286	4.410	558,731	105.820
Franklin, . . .	741,727	140.48	454,624	86.100	30,007	5.683	484,631	91.783
Hampden, . . .	764,713	141.84	366,062	69.333	—	—	366,062	69.333
Hampshire, . . .	552,989	104.74	307,245	58.187	41,538	7.867	348,783	66.054
Middlesex, . . .	1,933,120	365.99	822,633	155.804	6,255	1.184	828,888	156.988
Nantucket, . . .	34,185	6.47	34,211	6.480	—	—	34,211	6.480
Norfolk, . . .	1,037,272	196.44	399,102	75.587	12,889	2.441	411,991	78.028
Plymouth, . . .	1,156,334	219.00	686,653	130.057	28,399	5.378	715,052	135.435
Suffolk, . . .	75,095	14.23	38,947	7.380	—	—	38,947	7.380
Worcester, . . .	2,093,779	396.55	1,035,717	196.158	102,253	19.366	1,137,970	1,155.240
Totals, . . .	12,533,495	2,370.65	6,582,704	1,246.727	340,670	64.520	6,923,374	1,311.246

APPENDIX I.

TABLE SHOWING THE WORK DONE UNDER THE "SMALL TOWN" ACT SINCE ITS PASSAGE IN 1900.

[Section 23, Chapter 344, General Acts of 1917.]

TOWNS.	ALLOTMENTS.			LENGTHS BUILT (FEET).			Types of Roads.
	Previous to 1919.	In 1919.	Total Nov. 30, 1919.	Previous to 1919.	In 1919. ¹	Total Nov. 30, 1919.	
<i>Barnstable County.</i>							
Eastham,	\$7,410.40	-	\$7,410.40	25,178	-	25,178	Grading; sand and soil.
Harwich,	1,800.00	-	1,800.00	13,787	-	13,787	Sand and oil.
Mashpee,	1,200.00	-	1,200.00	1,944	-	1,944	Sand and oil.
Provincetown,	5,095.56	-	5,095.56	9,930	-	9,930	Macadam.
Truro,	5,000.00	-	5,000.00	21,300	-	21,300	Sand and oil.
Wellfleet,	1,653.00	-	1,653.00	2,250	-	2,250	Broken stone and clay.
	\$22,158.96	-	\$22,158.96	74,389	-	74,389	
<i>Berkshire County.</i>							
Alford,	\$5,969.00	-	\$5,969.00	14,909	-	14,909	Gravel.
Becket,	16,600.00	-	16,600.00	17,305	-	17,305	Gravel and macadam.
Cheshire,	750.00	-	750.00	2,500	-	2,500	-
Clarksburg,	1,380.00	-	1,380.00	2,400	-	2,400	Gravel.
Egremont,	9,232.30	-	9,232.30	22,642	-	22,642	Gravel.
Florida,	12,936.00	-	12,936.00	57,196	-	57,196	Gravel and grading.
Hancock,	5,373.39	-	5,373.39	9,038	-	9,038	Gravel.
Hinsdale,	9,300.00	-	10,300.00	12,106	-	12,106	Bituminous macadam and gravel.
Laurensborough,	6,802.00	-	6,802.00	5,500	-	5,500	Gravel road and steel concrete bridge.
Monterey,	8,368.00	-	8,368.00	21,001	-	21,001	Gravel.
Mount Washington,	5,642.00	750.00	6,392.00	6,380	-	6,380	Gravel and bridge repairs.
New Ashford,	2,561.00	-	2,561.00	2,600	-	2,600	Gravel road and culvert construction and repairs.

¹ Built with allotments made in previous years.

WORK DONE UNDER THE "SMALL TOWN" ACT—Continued.

TOWNS.	ALLOTMENTS.			LENGTHS BUILT (FEET).			Types of Roads.
	Previous to 1919.	In 1919.	Total to Nov. 30, 1919.	Previous to 1919.	In 1919. ¹	Total to Nov. 30, 1919.	
<i>Berkshire County</i> —Con.							
New Marlborough,	\$16,863 48	\$2,000 00	\$18,863 48	44,150	3,400	47,550	Gravel.
Otis,	9,435 92	—	9,435 92	15,200	—	15,200	Gravel.
Peru,	7,591 00	—	7,591 00	9,345	—	9,345	Gravel.
Richmond,	13,950 00	—	13,950 00	20,144	—	20,144	Bituminous gravel and macadam.
Sandisfield,	13,778 14	—	13,778 14	26,057	—	26,057	Macadam.
Savoy,	11,355 00	—	11,355 00	14,574	—	14,574	Gravel.
Sheffield,	8,488 00	—	8,488 00	16,182	—	16,182	Grading and gravel.
Tyringham,	12,415 00	—	12,415 00	19,133	—	19,133	Grading and macadam.
Washington,	9,848 00	400 00	10,248 00	14,420	—	14,420	Grading and gravel.
West Stockbridge,	13,626 00	—	13,626 00	22,799	—	22,799	Gravel.
Williamstown,	—	7,000 00	7,000 00	—	—	—	Bituminous macadam.
Windsor,	2,500 00	—	2,500 00	1,110	—	1,110	Macadam.
	\$204,764 23	\$11,150 00	\$215,914 23	376,691	3,400	380,091	
<i>Bristol County.</i>							
Berkley,	\$6,000 00	—	\$6,000 00	21,250	—	21,250	Gravel.
Dighton,	4,500 00	—	4,500 00	14,740	—	14,740	Gravel and macadam.
Easton,	12,000 00	—	12,000 00	31,686	—	31,686	Macadam.
Freetown,	2,350 00	—	2,350 00	4,360	—	4,360	Macadam.
Mansfield,	7,500 00	—	7,500 00	10,421	—	10,421	Bituminous macadam.
Norton,	4,176 00	—	4,176 00	9,850	—	9,850	Macadam.
Raynham,	7,316 00	—	7,316 00	10,685	—	10,685	Macadam.
Rehoboth,	11,250 00	—	11,250 00	25,200	—	25,200	Macadam and gravel.
Seekonk,	3,000 00	—	3,000 00	5,430	—	5,430	—
Westport,	12,900 00	—	12,900 00	43,300	—	43,300	Macadam and bituminous macadam.
	\$70,992 00	—	\$70,992 00	176,922	—	176,922	
<i>Essex County.</i>							
Boxford,	\$4,261 00	—	\$4,261 00	26,619	—	26,619	Gravel.
Danvers,	7,000 00	—	7,000 00	19,700	—	19,700	Gravel.
Essex,	1,932 00	—	1,932 00	34,500	—	34,500	Gravel and repairs.
Georgetown,	2,950 00	—	2,950 00	15,437	—	15,437	Gravel and macadam.
Groveland,	1,000 00	—	1,000 00	12,740	—	12,740	Bituminous gravel.
Lynnfield,	2,500 00	—	2,500 00	15,650	—	15,650	Gravel.

Marblehead,	7,800 00	-	7,800 00	11,008	-	11,008
Methuen,	500 00	-	500 00	7,500	-	7,500
Middleton,	3,944 00	-	3,944 00	11,900	-	11,900
North Andover,	4,000 00	-	4,000 00	13,950	-	13,950
Rookport,	4,000 00	\$3,000 00	7,000 00	6,900	-	6,900
Salisbury,	1,948 00	-	1,948 00	2,150	-	2,150
Saugus,	1,200 00	-	1,200 00	900	-	900
Swampscott,	2,925 00	-	2,925 00	5,200	-	5,200
Topsfield,	4,984 00	-	4,984 00	35,375	-	35,375
West Newbury,	2,200 00	-	2,200 00	3,293	-	3,293
	\$53,144 00	\$3,000 00	\$56,144 00	222,822	-	222,822
<i>Franklin County.</i>						
Ashfield,	\$4,000 00	-	\$4,000 00	10,800	-	10,800
Bernardston,	2,965 00	-	2,965 00	16,400	-	16,400
Buckland,	2,500 00	-	2,500 00	6,600	-	6,600
Charlemont,	6,900 00	-	6,900 00	11,254	-	11,254
Colrain,	11,175 00	-	11,175 00	27,950	-	27,950
Conway,	10,332 00	-	10,332 00	19,260	-	19,260
Erving,	3,000 00	-	3,000 00	4,450	-	4,450
Gill,	5,612 00	-	5,612 00	17,275	-	17,275
Hawley,	6,447 00	-	6,447 00	17,575	-	17,575
Heath,	8,777 00	-	8,777 00	12,272	-	12,272
Leicester,	11,226 00	-	11,226 00	25,229	-	25,229
Leyden,	6,043 00	-	6,043 00	17,900	-	17,900
Monroe,	9,467 04	-	9,467 04	13,670	-	13,670
New Salem,	14,402 00	-	14,402 00	28,772	-	28,772
Orange,	2,940 67	-	2,940 67	13,225	-	13,225
Rowe,	8,923 00	-	8,923 00	17,966	-	17,966
Shelburne,	2,500 00	-	2,500 00	7,300	-	7,300
Shutesbury,	4,934 00	-	4,934 00	12,800	-	12,800
Warwick,	8,420 00	-	8,420 00	9,200	-	9,200
Wendell,	13,388 00	-	13,388 00	21,400	-	21,400
Whately,	5,200 00	-	5,200 00	6,050	-	6,050
	\$149,171 71	-	\$149,171 71	317,348	-	317,348
<i>Hampden County.</i>						
Blandford,	\$16,235 16	-	\$16,235 16	9,010	-	9,010
Brimfield,	9,600 00	-	9,600 00	13,270	-	13,270
Chester,	7,171 43	-	7,171 43	17,651	-	17,651
East Longmeadow,	10,863 75	-	10,863 75	19,510	-	19,510
Granville,	13,173 00	-	13,173 00	25,800	-	25,800
Hampden,	8,208 00	-	8,208 00	46,118	-	46,118

¹ Built with allotments made in previous years.

WORK DONE UNDER THE "SMALL TOWN" ACT — *Continued.*

TOWNS.	ALLOTMENTS.			LENGTHS BUILT (FEET).			Types of Roads.
	Previous to 1919.	In 1919.	Total to Nov. 30, 1919.	Previous to 1919.	In 1919. ¹	Total to Nov. 30, 1919.	
<i>Hampden County — Con.</i>							
Holland,	\$2,414.00	—	\$2,414.00	5,022	—	5,022	Grading and gravel.
Longmeadow,	1,200.00	—	1,200.00	1,425	—	1,425	Macadam and concrete culvert.
Ludlow,	5,457.00	—	5,457.00	6,150	—	6,150	Gravel.
Monson,	5,800.00	—	5,800.00	4,601	—	4,601	Macadam.
Montgomery,	3,020.00	—	3,020.00	6,850	—	6,850	Gravel.
Russell,	2,693.85	—	2,693.85	2,086	—	2,086	Grading and bituminous macadam.
Southwick,	10,128.00	—	10,128.00	34,161	—	34,161	Gravel.
Tolland,	8,392.06	—	8,392.06	11,412	—	11,412	Grading, gravel and concrete culvert.
Wilbraham,	4,400.00	—	4,400.00	6,000	—	6,000	Gravel.
	\$108,756.25	—	\$108,756.25	209,066	—	209,066	
<i>Hampshire County.</i>							
Amherst,	\$6,800.00	—	\$6,800.00	6,505	—	6,505	Water-bound and bituminous macadam.
Belchertown,	1,000.00	—	1,000.00	1,200	—	1,200	Gravel.
Chesterfield,	10,809.52	—	10,809.52	13,581	—	13,581	Gravel and concrete bridge.
Cummington,	4,233.00	—	4,233.00	9,900	—	9,900	Gravel.
Easthampton,	4,000.00	—	4,000.00	6,430	—	6,430	Macadam.
Eastfield,	12,670.56	—	12,670.56	39,410	—	39,410	Gravel.
Goshen,	1,400.00	—	1,400.00	1,800	—	1,800	Gravel.
Greenwich,	7,951.00	—	7,951.00	21,400	—	21,400	Gravel.
Hadley,	11,500.00	—	11,500.00	12,850	—	12,850	Macadam.
Hatfield,	5,000.00	—	5,000.00	7,865	—	7,865	Macadam.
Huntington,	5,050.00	—	5,050.00	10,025	—	10,025	Gravel.
Middlefield,	4,960.00	—	4,960.00	9,008	—	9,008	Gravel.
Pelham,	9,820.00	—	9,820.00	11,550	—	11,550	Gravel.
Plainfield,	6,580.00	—	6,580.00	6,580	—	6,580	Gravel.
Prescott,	8,728.50	—	8,728.50	15,930	—	15,930	Grading and gravel.
Southampton,	5,523.83	—	5,523.83	11,613	—	11,613	Gravel.
Westhampton,	9,151.84	—	9,151.84	20,853	—	20,853	Gravel.
Williamsburg,	4,127.25	—	4,127.25	8,950	—	8,950	Macadam.
Worthington,	11,677.00	—	11,677.00	22,243	—	22,243	Gravel.
	\$130,982.50	—	\$130,982.50	242,587	—	242,587	

¹ Built with allotments made in previous years.

WORK DONE UNDER THE "SMALL TOWN" ACT — Concluded.

TOWNS.	ALLOTMENTS.			LENGTHS BUILT (FEET).			Types of Roads. Nov. 30, 1919.
	Previous to 1919.	In 1919.	Total to Nov. 30, 1919.	Previous to 1919.	In 1919, 1	Total to Nov. 30, 1919.	
<i>Plymouth County.</i>							
Abington,	\$2,600 00	\$1,500 00	\$2,600 00	5,760	—	5,760	Macadam.
Bridgewater,	2,076 20	—	3,576 20	6,291	—	6,291	Bituminous macadam.
Carver,	23,290 00	—	23,290 00	59,615	—	59,615	Macadam.
Duxbury,	3,500 00	—	3,500 00	7,490	—	7,490	Gravel.
East Bridgewater,	10,142 87	—	10,142 87	22,149	—	22,149	Macadam and bituminous macadam.
Halifax,	11,704 00	—	11,704 00	23,455	—	23,455	Macadam.
Hanover,	2,048 82	2,048 82	2,048 82	2,827	—	2,827	Macadam.
Hanson,	22,597 25	—	22,597 25	54,760	—	54,760	Macadam.
Lakeville,	6,200 00	—	6,200 00	21,181	—	21,181	Macadam and gravel.
Marsfield,	7,500 00	—	7,500 00	3,600	—	3,600	—
Norwell,	8,880 00	—	8,880 00	33,441	—	33,441	Gravel and macadam.
Pembroke,	7,823 45	—	7,823 45	38,033	—	38,033	Gravel and macadam.
Plymouth,	1,000 00	—	1,000 00	2,000	—	2,000	Sand and oil.
Plympton,	8,617 00	—	8,617 00	39,740	—	39,740	Gravel.
Rochester,	7,500 00	—	7,500 00	32,572	—	32,572	Macadam and gravel.
Rockland,	2,125 00	—	2,125 00	4,702	—	4,702	—
Wareham,	3,737 59	—	3,737 59	9,540	—	9,540	—
West Bridgewater,	6,000 00	—	6,000 00	3,950	—	3,950	Sand and oil, and bituminous macadam.
							Bituminous gravel.
\$137,342 18	\$1,500 00	\$138,842 18	371,112	—	371,112	—	
<i>Worcester County.</i>							
Ashburnham,	\$9,594 00	—	\$9,594 00	26,715	—	26,715	Gravel.
Berlin,	8,324 00	—	8,324 00	28,558	—	28,558	Gravel.
Bolton,	12,614 00	—	12,614 00	55,188	—	55,188	Gravel.
Boylston,	5,560 00	—	5,560 00	18,590	—	18,590	Gravel.
Brookfield,	900 00	—	900 00	2,500	—	2,500	Macadam.
Dana,	10,519 00	—	10,519 00	28,830	—	28,830	Gravel.
Douglas,	1,500 00	—	1,500 00	4,500	—	4,500	Macadam.
Hardwick,	10,500 00	—	10,500 00	21,950	—	21,950	Macadam.
Harvard,	7,700 00	—	7,700 00	2,875	—	2,875	Macadam.
Holden,	1,200 00	—	1,200 00	1,600	—	1,600	Gravel.

	12,435 00	-	12,435 00	27,663
Hubbardston,	8,039 00	-	8,039 00	24,517
Mendon,	6,000 00	-	6,000 00	4,240
Millbury ¹ ,	2,500 00	-	2,500 00	5,425
New Brantree,	2,000 00	-	2,000 00	2,155
Northborough,	2,000 00	-	2,000 00	2,400
North Brookfield,	2,000 00	-	2,000 00	26,230
Oakham,	10,518 00	-	10,518 00	10,518
Oxford,	4,600 00	-	4,600 00	7,200
Paxton,	7,200 00	-	7,200 00	11,310
Petersham,	11,310 00	-	11,310 00	4,650
Phillipston,	6,050 00	-	6,050 00	6,143
Princeton,	6,143 12	-	6,143 12	8,200
Royalston,	8,200 00	-	8,200 00	7,454
Rutland,	3,800 00	-	3,800 00	11,125
Shrewsbury,	3,800 00	-	3,800 00	3,500
Southbridge,	11,125 00	-	11,125 00	5,350
Spencer,	3,500 00	-	3,500 00	5,350
Sturbridge,	5,350 00	-	5,350 00	4,221
Templeton,	4,221 70	-	4,221 70	7,500
Westborough,	7,500 00	-	7,500 00	4,950
West Brookfield,	4,950 00	-	4,950 00	500
Westminster,	500 00	-	500 00	9,000
Winchendon,	9,000 00	-	9,000 00	9,000
	\$212,656 82	-	\$212,656 82	498,090
				-
				498,090

¹ Built with allotments made in previous years.

SUMMARY.

COUNTIES.	ALLOTMENTS.			LENGTHS BUILT (FEET).		
	Previous to 1919.	In 1919.	Total to Nov. 30, 1919.	Previous to 1919.	In 1919.	Total to Nov. 30, 1919.
Barnstable,	\$22,158 96	\$11,150 00	\$22,158 96	74,389	—	74,389
Berkshire,	204,764 23	—	215,914 23	376,691	3,400	380,091
Bristol,	70,992 00	—	70,992 00	176,922	—	176,922
Essex,	53,144 00	3,000 00	56,144 00	222,822	—	222,822
Franklin,	149,171 71	—	149,171 71	317,348	—	317,348
Hampden,	108,756 25	—	108,756 25	209,066	—	209,066
Hampshire,	130,982 50	—	130,982 50	242,587	—	242,587
Middlesex,	135,081 87	—	135,081 87	341,862	—	341,862
Norfolk,	34,309 92	—	34,309 92	49,017	—	49,017
Plymouth,	1,500 00	—	138,842 18	371,112	—	371,112
Worcester,	212,656 82	—	212,656 82	498,090	—	498,090
	\$1,259,360 44	\$15,650 00	\$1,275,010 44	2,929,906	3,400	2,933,306

APPENDIX J.

APPROPRIATIONS.

Appropriations for the Construction and Repair of State Highways.

1894, chapter 497, section 8,	. . . . .	\$300,000 00
1895, chapter 347, section 3,	. . . . .	400,000 00
1896, chapter 481, section 3,	. . . . .	600,000 00
1897, chapter 340, section 1,	. . . . .	800,000 00
1898, chapter 539, section 1,	. . . . .	400,000 00
1899, chapter 396, section 1,	. . . . .	500,000 00
1900, chapter 442, section 1,	. . . . .	500,000 00
1901, chapter 269, section 1,	. . . . .	500,000 00
1902, chapter 246, section 1,	. . . . .	500,000 00
1903, chapter 280, section 1,	. . . . .	2,250,000 00 ¹
1907, chapter 446, section 1,	. . . . .	2,500,000 00 ¹
1912, chapter 704, section 1,	. . . . .	5,000,000 00 ¹
1919, chapter 330, .	. . . . .	4,000,000 00 ²
		<hr/>
		\$18,250,000 00

Appropriations for the Salaries and Expenses of the Commission, paid from the Treasury of the Commonwealth.

1898, chapter 497, section 1,	. . . . .	\$14,300 00
1899, chapter 367, section 1,	. . . . .	28,500 00
1900, chapter 141, section 1,	. . . . .	28,500 00
1901, chapter 451, section 1,	. . . . .	33,750 00
1902, chapter 67, section 1, .	. . . . .	33,750 00
1903, chapters 14 and 485, section 1, .	. . . . .	43,950 00 ³
1904, chapters 19 and 461, section 1, .	. . . . .	39,300 00 ³
1905, chapters 36, 431 and 480, section 1, .	. . . . .	46,150 00 ³
1906, chapters 36 and 140, section 1, .	. . . . .	47,484 93 ³
1907, chapter 157, section 1,	. . . . .	66,950 00 ⁴
1908, chapter 212, section 1,	. . . . .	76,300 00 ⁴

¹ To cover expense of construction for a period of five years.² To cover expense of construction for a period of four years.³ Includes expense of automobile department.⁴ Includes expense of moth suppression and automobile department in part.

1909, chapter 127,	\$47,300 00 ¹
1910, chapter 139,	56,250 00 ¹
1911, chapter 555, section 1,	61,250 00 ¹
1912, chapter 287, section 1,	61,500 00 ¹
1913, chapter 35, section 1,	98,500 00 ²
1914, chapter 236, section 1,	105,000 00 ²
1915, Special, chapter 183, section 1,	104,000 00 ²
1916, Special, chapter 208, section 1,	103,550 00 ²
1917, Special, chapter 63, section 1,	115,200 00 ²
1918, Special, chapter 106-S, section 2,	65,500 00
1919, Special, chapter 153-S, section 2,	68,500 00

Appropriations for Maintenance, paid from the Treasury of the Commonwealth.

1903, chapter 280, section 2,	\$40,000 00
1904, chapter 316, section 1,	50,000 00
1905, chapter 36, section 1,	60,000 00
1906, chapter 36, section 1,	64,166 66
1907, chapter 157, section 1,	100,000 00
1908, chapters 212 and 657, section 1,	150,000 00
1909, chapters 127 and 493, section 1,	250,000 00
1910, chapter 139, section 1,	200,000 00
1911, chapter 555, section 1,	200,000 00
1912, chapter 287, section 1,	200,000 00
1913, chapter 35, section 1,	200,000 00
1914, chapter 346, section 1,	350,000 00 ³
1915, chapter 183, section 1,	350,000 00 ³
1916, Special, chapter 208, section 1,	415,000 00 ³
1917, Special, chapter 63, section 1,	404,547 86 ³
1918, Special, chapter 106-S, section 2,	258,462 80
1919, Special, chapter 153-S, section 2,	312,524 64

¹ Includes expense of moth suppression.

² Includes expense of moth suppression and maintenance of Fall River and Newburyport bridges.

³ Includes appropriations for widening.

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